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# IGARSS 2003

2003 IEEE International Geoscience and Remote Sensing Symposium



Learning From Earth's Shapes & Colors

**2003 IEEE International Geoscience and Remote Sensing Symposium**

**July 21-25, 2003 Toulouse, France**

# Welcome

Welcome to the 2003 IEEE International Geoscience and Remote Sensing Symposium on CD-ROM. This disc is designed so that you may locate papers by session or author, as well as with full text search of title and body.

Papers originated as electronic files. The papers were converted to Adobe Acrobat PDF file format for cross-platform access. The viewing quality will vary with the size and quality of fonts used. Even though the viewing quality on your monitor may vary, all papers print clearly.

Be sure to read the "Getting Started" section for useful recommendations on how to use this electronic guide.

Thank you and enjoy!



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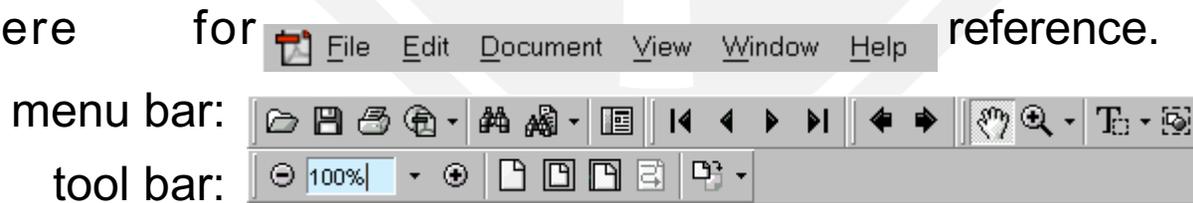
## ORIENTATION

This Electronic Guide file contains hypertext links to individual article files. Links are represented by colored text (e.g., a name or title); clicking on the text activates the link.

Before you start browsing and using the information on this CD-ROM, you will need to install Adobe Acrobat Reader + Search 5.0. If you already have Acrobat Reader installed on your system, make sure it is version 4.0 or higher and includes the Search plug-in.

To install, click on "[README.TXT](#)" which contains additional information.

In many instances, we refer to the "menu bar" and "tool bar", shown here for reference.



**Be sure to read the following on how to achieve the best performance with this electronic guide.**



# Getting Started

## RECOMMENDATIONS FOR OPTIMAL PERFORMANCE

In order to take full advantage of the performance capabilities of this collection, we recommend that you do the following:

1. To make navigation and searching easier, we strongly recommend changing the following Acrobat Search Preferences (found under Edit> Preferences > Search on the menu bar.) In the dialog box shown for Acrobat Search Preferences, make the following changes:

A. Select the “Document Information” option so that Title, Author, Keywords, and Subject fields are visible when specifying search criteria. If for some reason this preference option is not present on your system, check to see that you

have the Search plug-in installed. The Search icon  will be present on the Acrobat tool bar if the function is properly installed. Specifics of the Search function are described later in this section.

B. Change “Show first 100 documents” to “Show first 1000 documents”. (Type in “1000” in the field provided.) This allows the maximum number of hits to be displayed during a search.

These settings will become your new default.



# Getting Started

## USING BOOKMARKS

In addition to links, you can navigate through the Electronic Guide using Bookmarks. If they are not already visible, choose Window > Bookmarks from the menu bar or press the “Show/Hide Navigation Pane” button on the tool bar. A panel opens on the left side of the screen displaying Bookmarks in a hierarchy.

Each Bookmark corresponds to a location in the Electronic Guide. Click on the text in a Bookmark to go to that location.

Entries with lower level Bookmarks show a plus sign (+) when subordinate Bookmarks are hidden and a negative sign (-) when subordinate Bookmarks are visible. To view subordinate Bookmarks, click on the plus sign (+). To hide them, click on the negative sign (-). Dragging the right margin of the bookmark panel resizes it. Dragging the Bookmark tab moves the panel to a different location.

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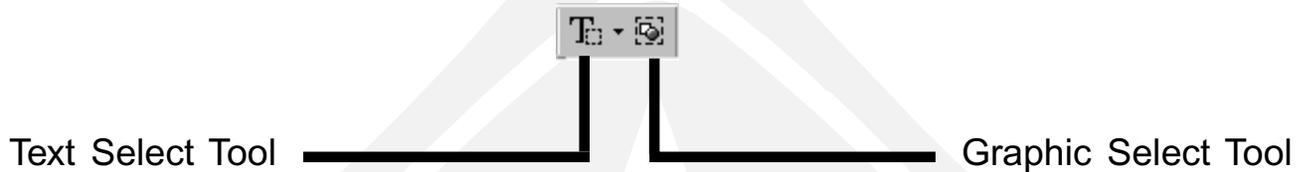
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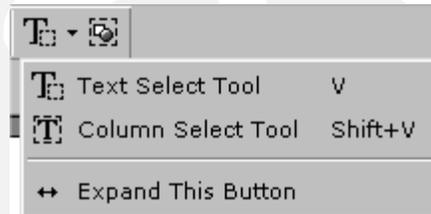
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## SELECTING TEXT AND GRAPHICS

To select text or graphics, the appropriate select tool must be selected. The select tools share the same space on the tool bar.



To see more text selection tools you must click the arrow to the right of the Text Select Tool. A “flyout” menu will allow you to select the Column Select Tool.



See the Adobe Acrobat Reader 5.0 Guide (Help > Reader Help) for more information on these tools.

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## NAVIGATION BUTTONS

### Section Map

The current section is shown at the top of each page. The “path” to this section is shown at the right. Clicking these text buttons moves you to the start of that section.

### Next Page

Click to advance to the next page in the section.



### Previous Page

Click to go back to the previous page in the section.



(The Page Up and Page Down keys perform the same functions as the Next and Previous Page buttons.)

### Fast Forward Pages

Click to advance (jump) multiple pages in the section.



### Fast Back Pages

Click to go back (jump) multiple pages in the section.

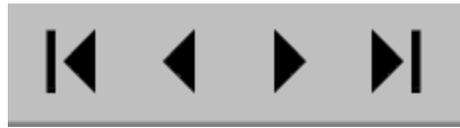


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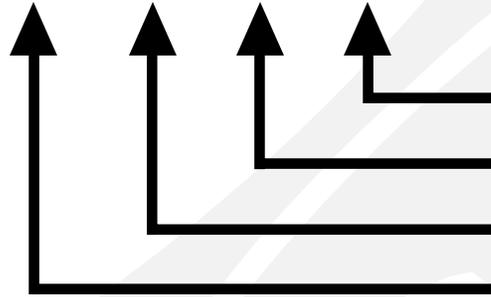


# Getting Started

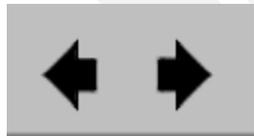
## ACROBAT TOOLBAR



### Navigation



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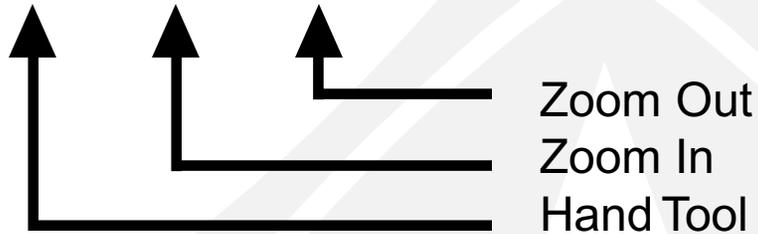


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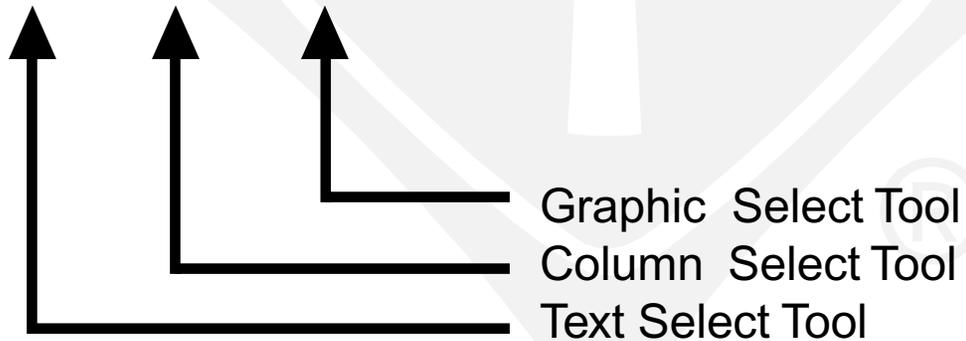
## ACROBAT TOOLBAR



Zoom



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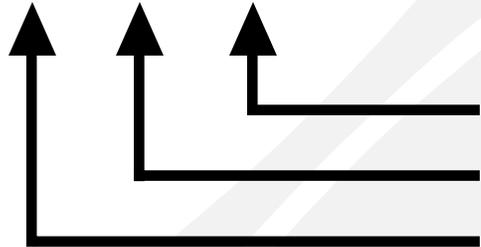
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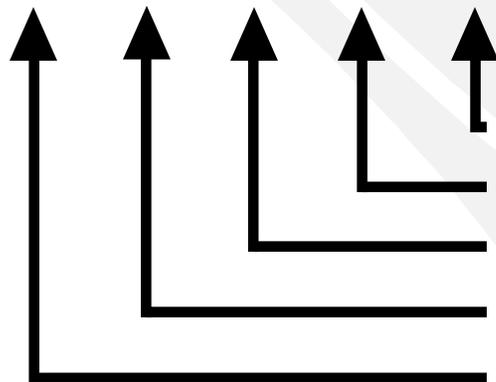
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# Getting Started

## PERFORMING A “FIND”

Choosing Find opens a dialog box. Find scans linearly through the currently open Acrobat file from the cursor forward. If the Electronic Guide PDF is open, Find will scan the entire Electronic Guide for a match to your text. Type a text string in the field provided, check the appropriate options and press the “Find” button. Reader then highlights the first instance of the text string. To look at the next “hit”, click on the Find icon and press the “Find Again” button in the Acrobat Find window.

## PERFORMING A “SEARCH”

Choosing the “Search” tool bar button or Search menu item (Edit > Search > Query), opens a dialog box from which you can access the more powerful full-text search engine (if you installed Acrobat Reader from this CD-ROM). Its dialog box is shown on the next page.

Typing a term in the text box at the top of the Search dialog box and pressing the “Search” button causes a full-text search of all words in the body of papers in the collection. If you have “Document

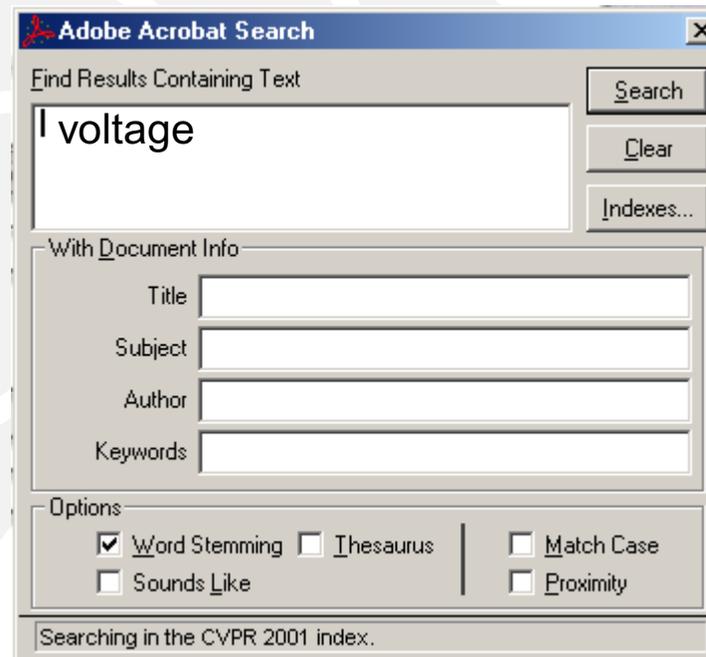


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Information” active in your Reader preferences, entering a term in one or more of the fixed fields (Title, Author, Subject or Keywords) will cause a search for hits in only those fields.

If you are not finding files you think should show in the results list, Acrobat may not be attached to the correct index file. To check, press the “Indexes...” button for a list of available indexes. If this collection is not listed, press the “Add...” button and look in the root directory of the CD-ROM for a file called “index.pdx”. Click on that file to add it to the list.

See the Reader Help (on Help menu) for more complete instructions on selecting appropriate options, constructing boolean queries, etc.



# Sessions

## Monday

---

- SMOS
- ADEOS II
- 25th Anniversary of the Seasat Launch - Seasat Legacy
- Geographic Information Systems
- Remote Sensing of Sea Ice
- Hyperspectral Processing and Analysis
- RADARSAT-1
- Rough Surface Scattering
- An Earth Science Vision: Global Understanding of the Complexities of Our Planet
- Remote Sensing Applications in Agriculture
- PART I: Image Registration and Geocoding; PART II: Optical Stereoscopy and Radargrammetry

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## Tuesday

---

- Information Extraction from High Resolution SAR Data
- Deformation: Earthquakes, Subsidence and Volcanos
- Ocean Waves and Winds
- Land Use - Land Cover
- Sea Ice Information from Newly Multi-Sensor Satellite Data
- Hyperspectral Methods
- SPOT-5 Part I
- Student Prize Paper Competition
- NPOESS
- Agriculture II
- Soil Moisture and Hydrological Modeling
- Advances in Polarimetry
- Optical Very High Resolution Image Processing
- PART I: Educational Techniques in Remote Sensing; PART II: SIBERIA II

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- ❑ Instrumentation and Future Technologies
- ❑ Reconfigurable SAR Systems
- ❑ Hyperspectral Applications
- ❑ SPOT-5 Part II
- ❑ Vegetation Fluorescence
- ❑ Earth Observing Architectures: Technology Challenges for the Coming Generation of Earth Explorers
- ❑ Data Archiving and Distribution
- ❑ First AMSR Science Results

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# Sessions

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## Wednesday

---

- Pol- and Pol-INSAR Data Processing I
- WINDSAT
- Optical Image Processing
- Mine and Target Detection
- Bistatic Radar Remote Sensing
- Registration and Combination of Imagery
- In-Flight Ocean Altimetry
- Snow Cover
- EOS Terra and Aqua MODIS Validated Science Results
- Spaceborne Remote Sensing of Precipitation
- Soil Moisture Retrieval
- Polarimetric and Interferometric Data Processing
- Near Surface Ocean Processes
- Vegetation and Forest Analysis

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# Sessions

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- ❑ Military Applications of Remote Sensing
- ❑ Data Fusion Applications
- ❑ Present and Future Altimeters
- ❑ Electromagnetics and GPS
- ❑ ENVISAT/ASAR
- ❑ Techniques for Remote Sensing of Precipitation
- ❑ Hydrological Applications

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# Sessions

## Thursday

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- Interferometric SAR Processing
- Advanced Microwave Radiometer Techniques
- Active Sensing of Ocean Winds
- Aerosols: Characterization and Sensing
- Environmental Hazards
- RADARSAT-2 and TERRASAR
- Future NASA Earth Observing System Missions
- Volume and Subsurface Scattering
- ENVISAT / Atmospheric Chemistry
- Change Detection Techniques
- Active Microwave Soil Moisture and Roughness
- Polarimetric Interferometry and Applications
- SAR and Bistatic SAR Processing
- Remote Sensing Potential to Support Multi-National Environmental Conventions

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- ❑ Spaceborne Lidar: CALIPSO and GLAS
- ❑ Disaster and Hazards
- ❑ Geological Process Monitoring
- ❑ The Dynamic Landscape
- ❑ ENVISAT / MERIS-AATSR
- ❑ Ice Sheets and Glaciers
- ❑ Estimating Vegetation Parameters Using SAR

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## Friday

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- TRMM & GPM I
- Urban Planning and Environmental Monitoring
- PART I: Frequency Allocations in Remote Sensing; PART II: Lidar Remote Sensing
- Hyperspectral Applications and Methods II
- Classification and Segmentation I
- Compression Techniques Applicable to Multidimensional Remote Sensing Data
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- ❑ TRMM & GPM II
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- ❑ PART I: New Hyperspectral Instruments and Techniques; PART II: Data Compression
- ❑ Classification and Segmentation II
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- ❑ Coastal Environment
- ❑ Novel Radar and Radiometry Concepts and Technology

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- ❑ E03 - Detection & Imaging of Buried or Camouflaged Objects
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- ❑ E07 - Propagation Through Discrete & Continuous Random Media
- ❑ E08 - Surface & Volume Scattering

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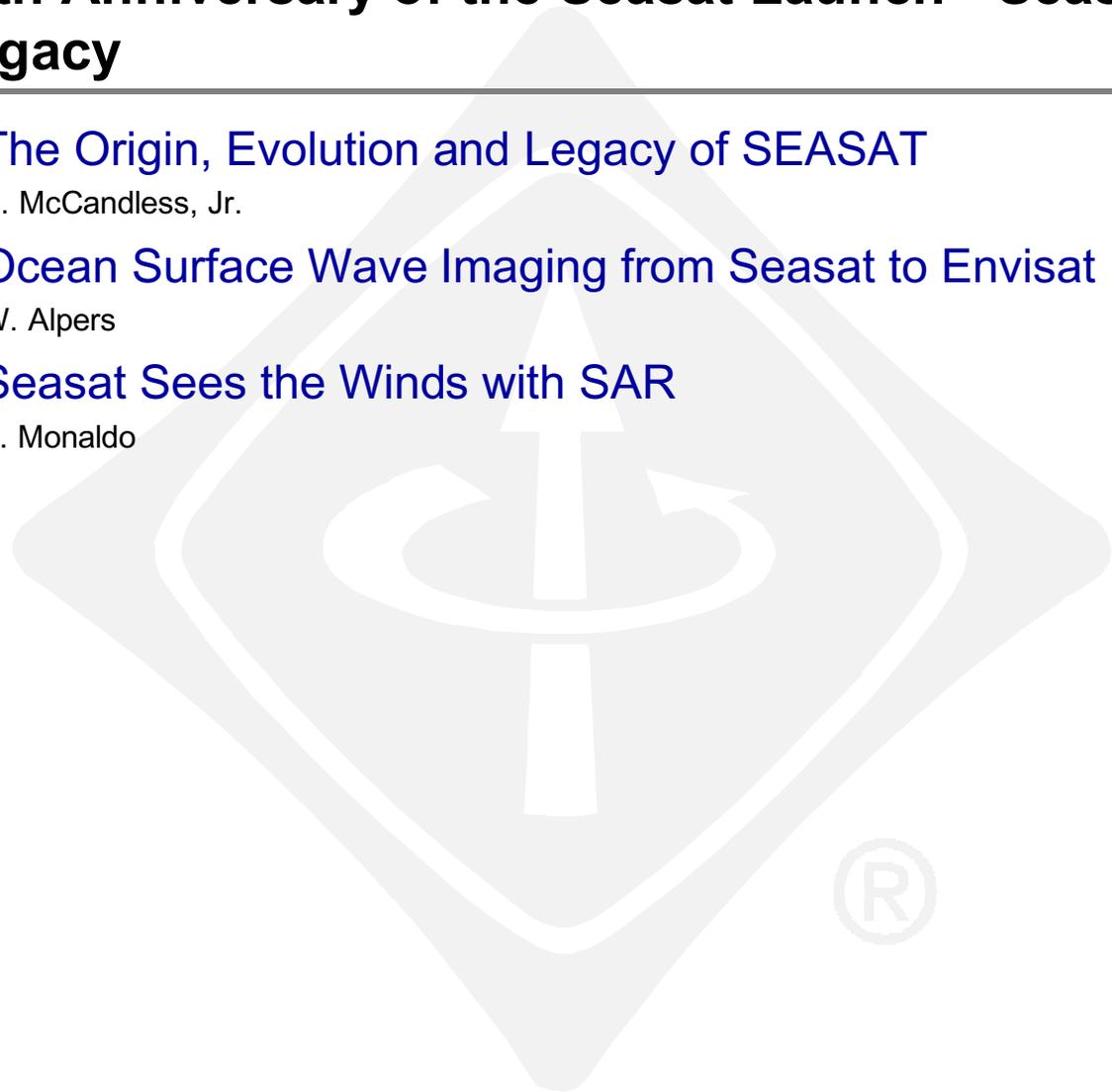


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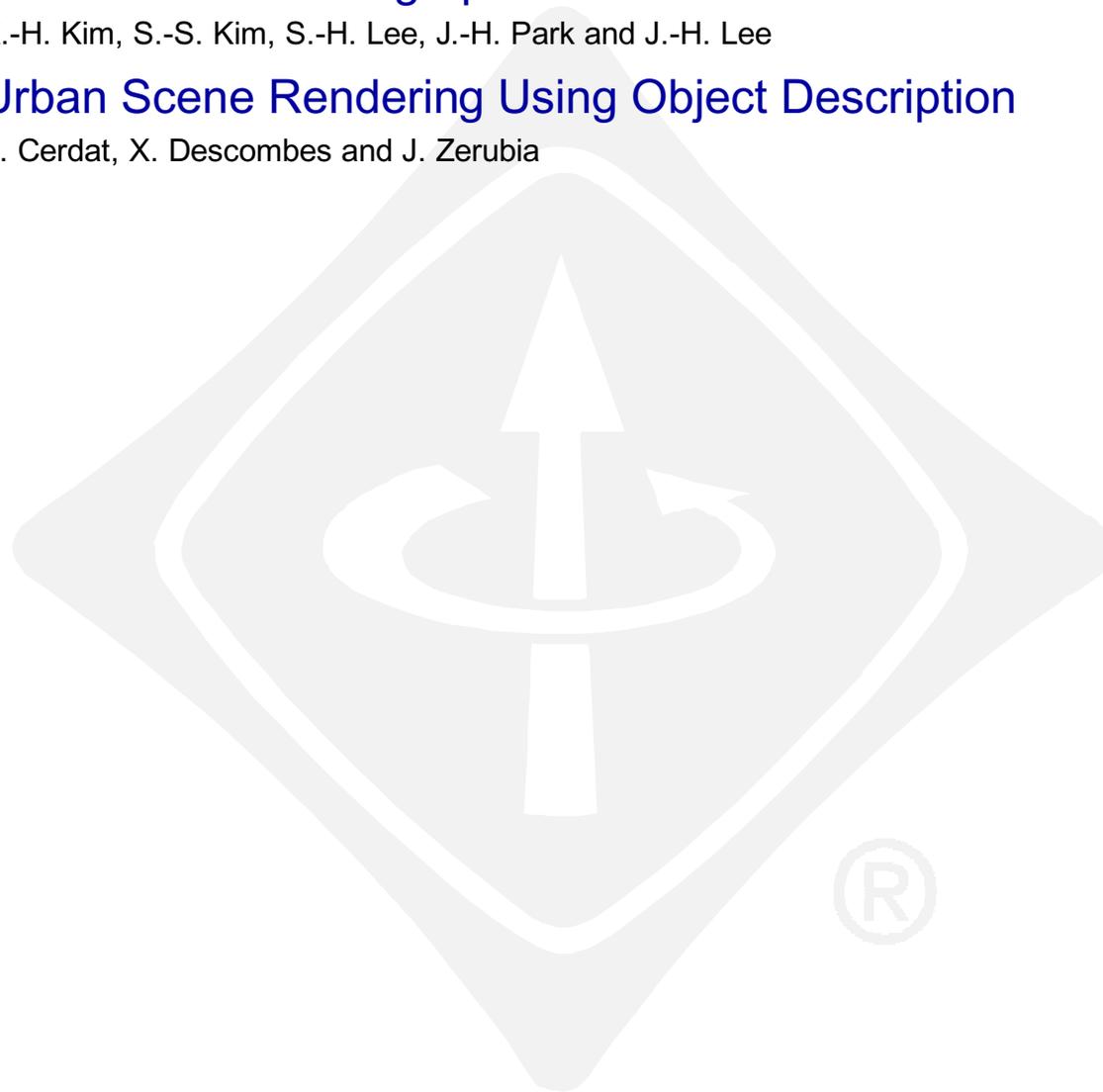
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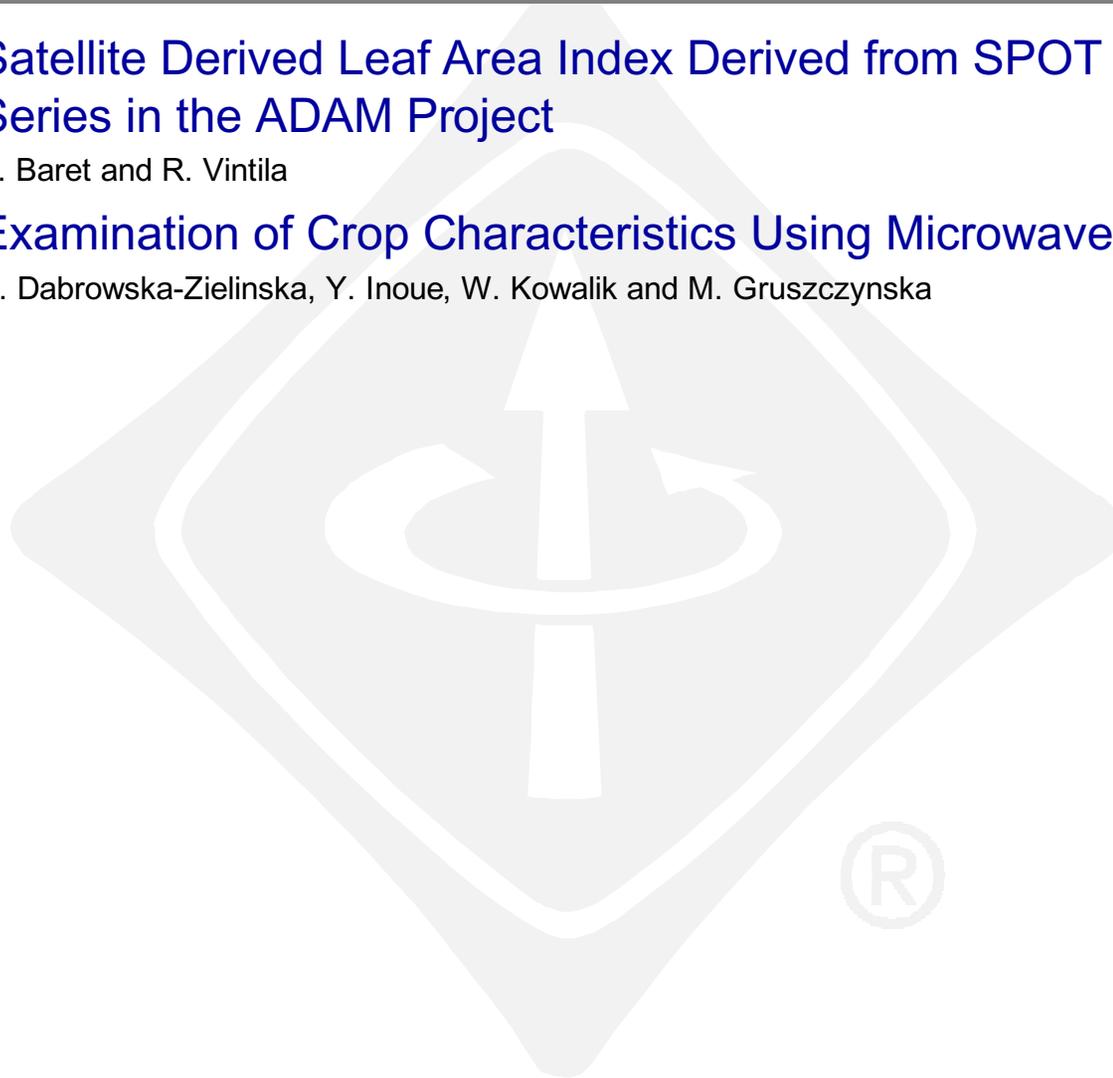


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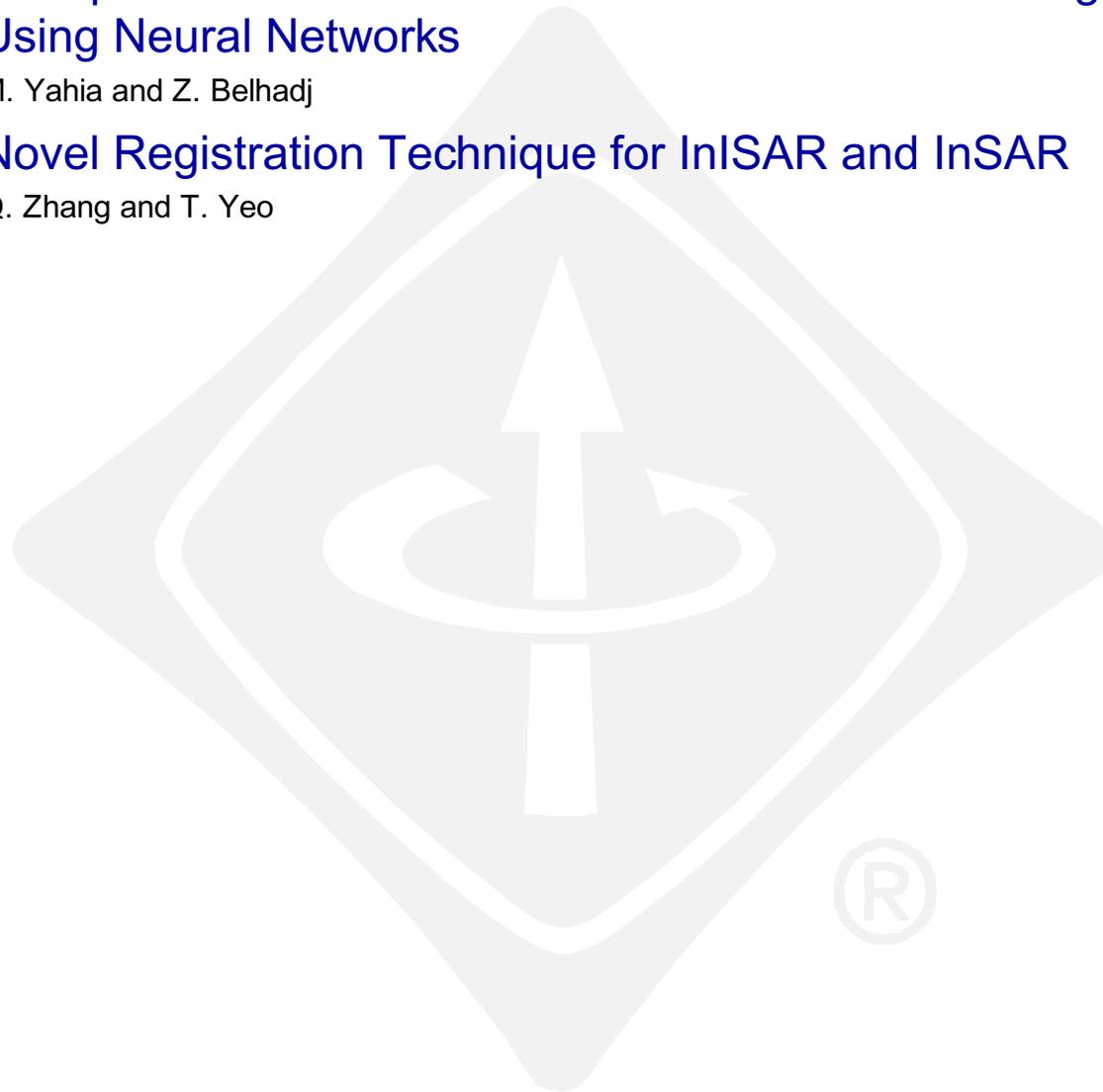
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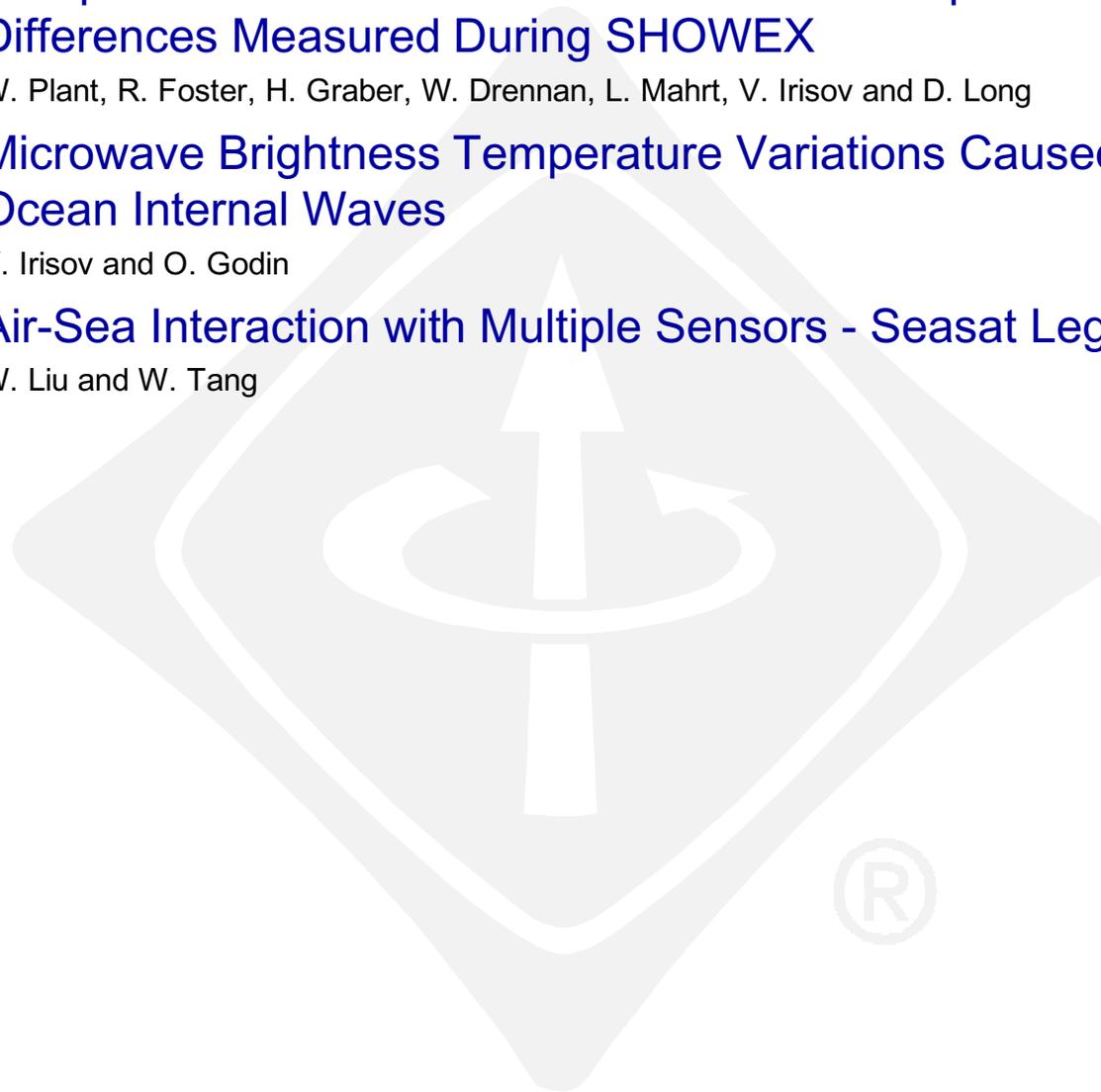
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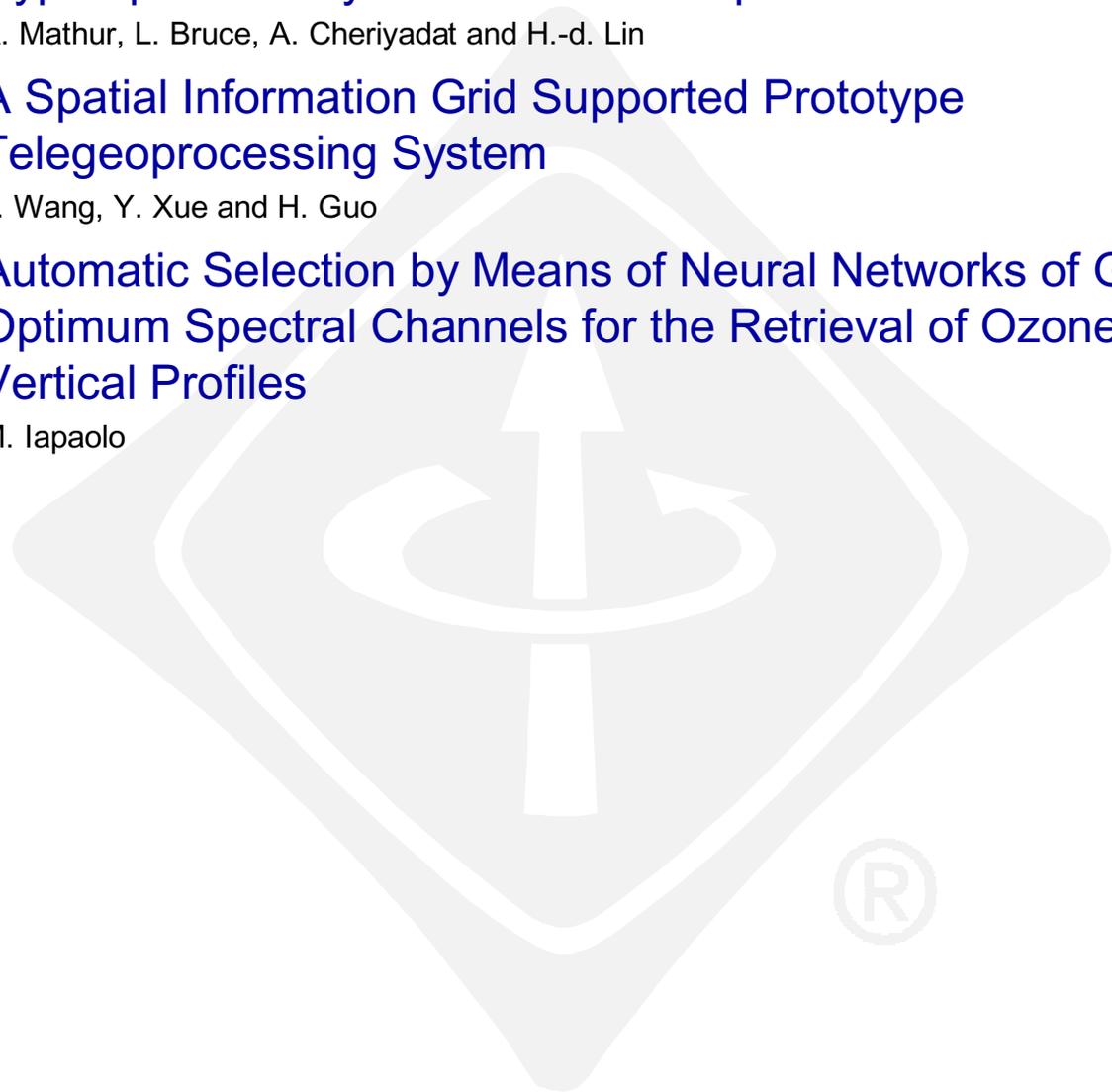
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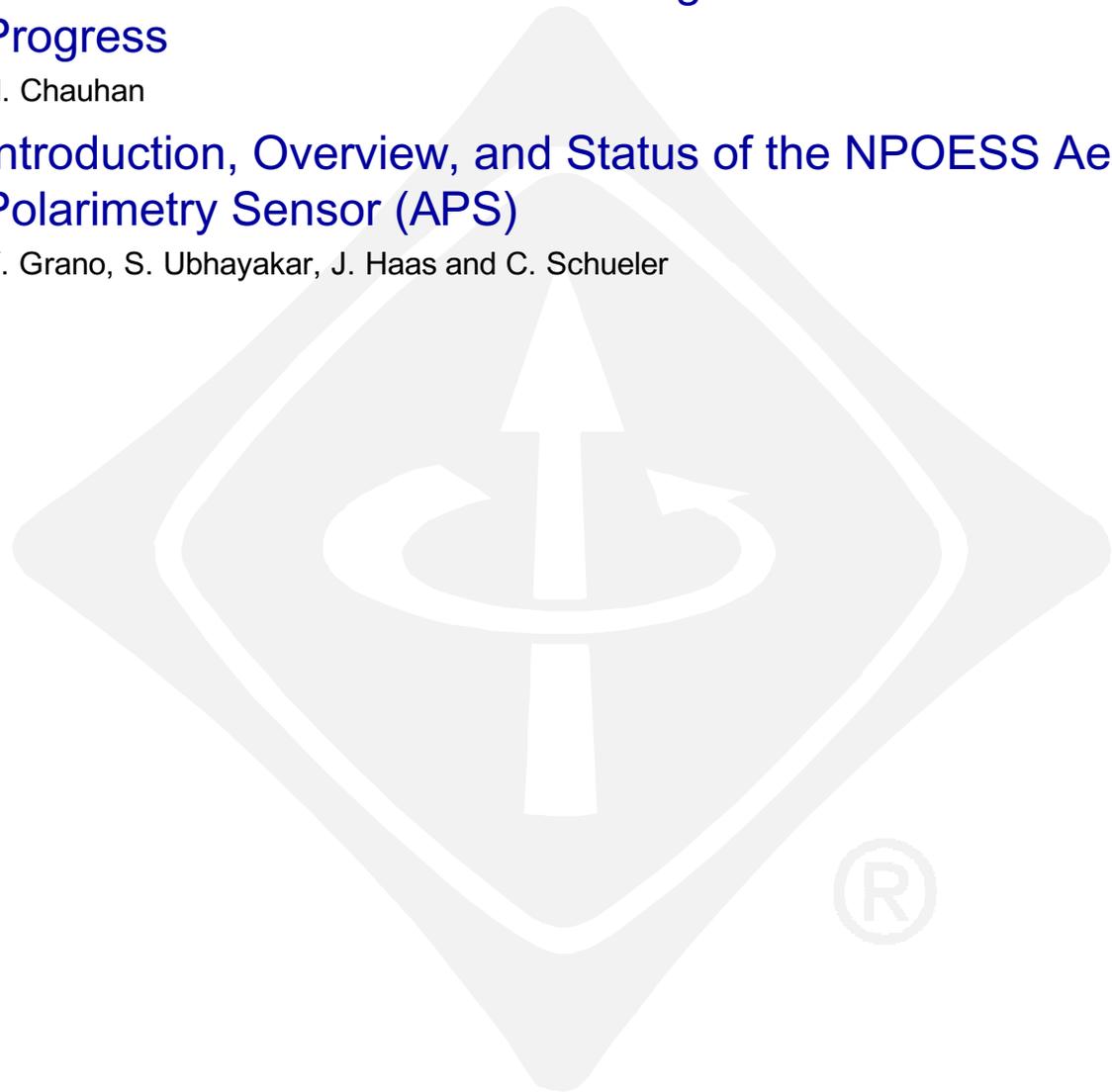
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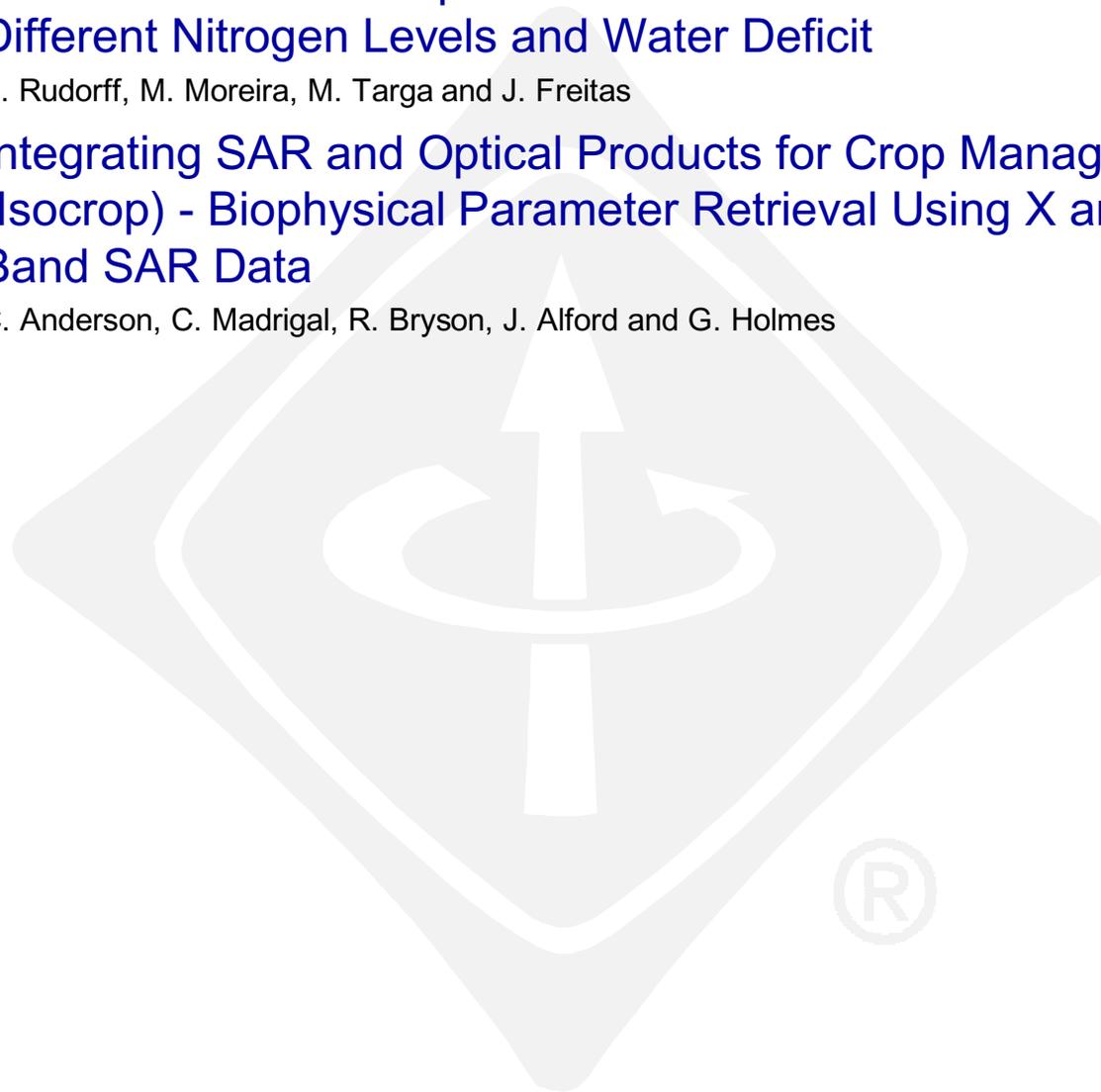
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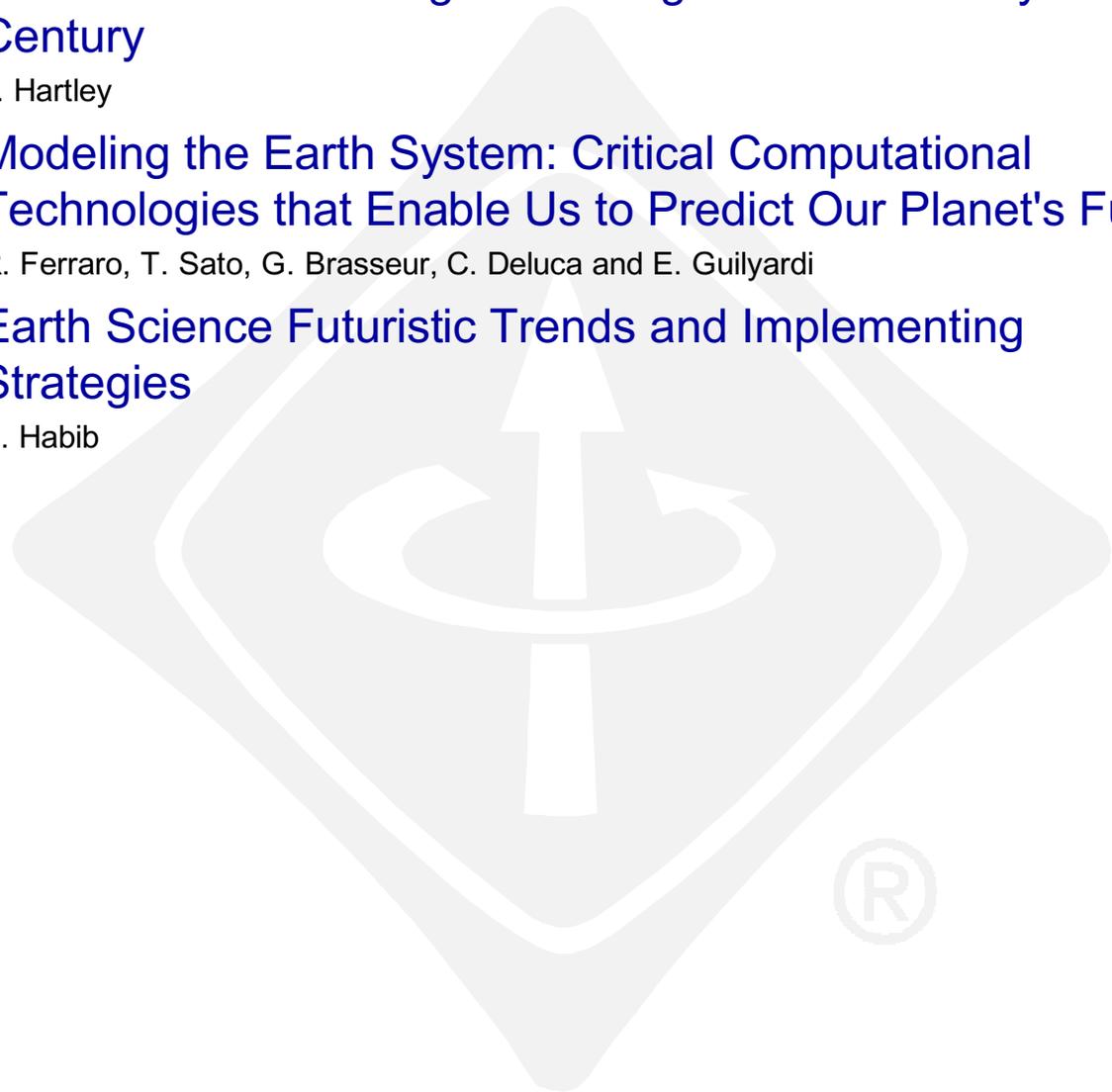
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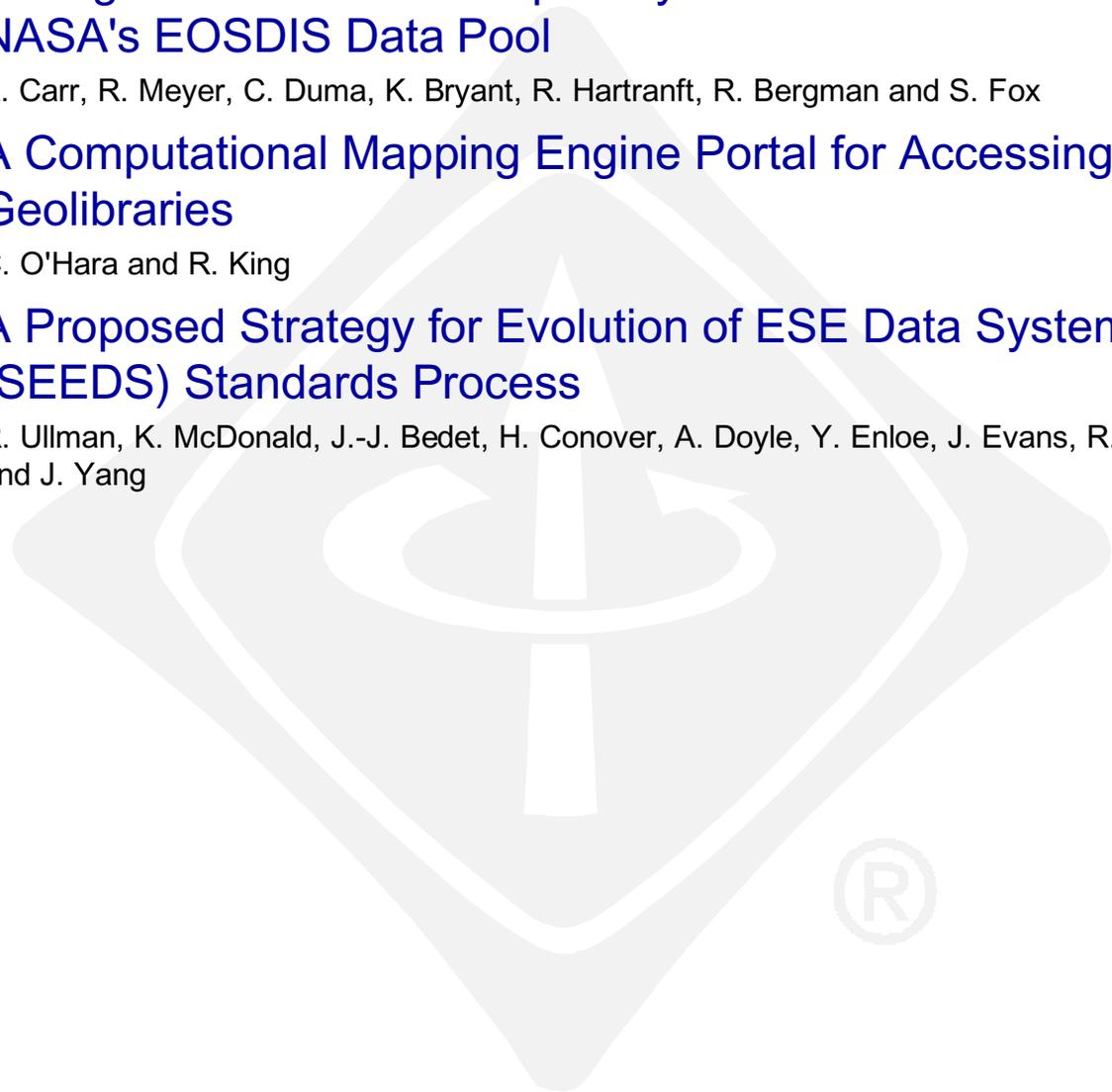
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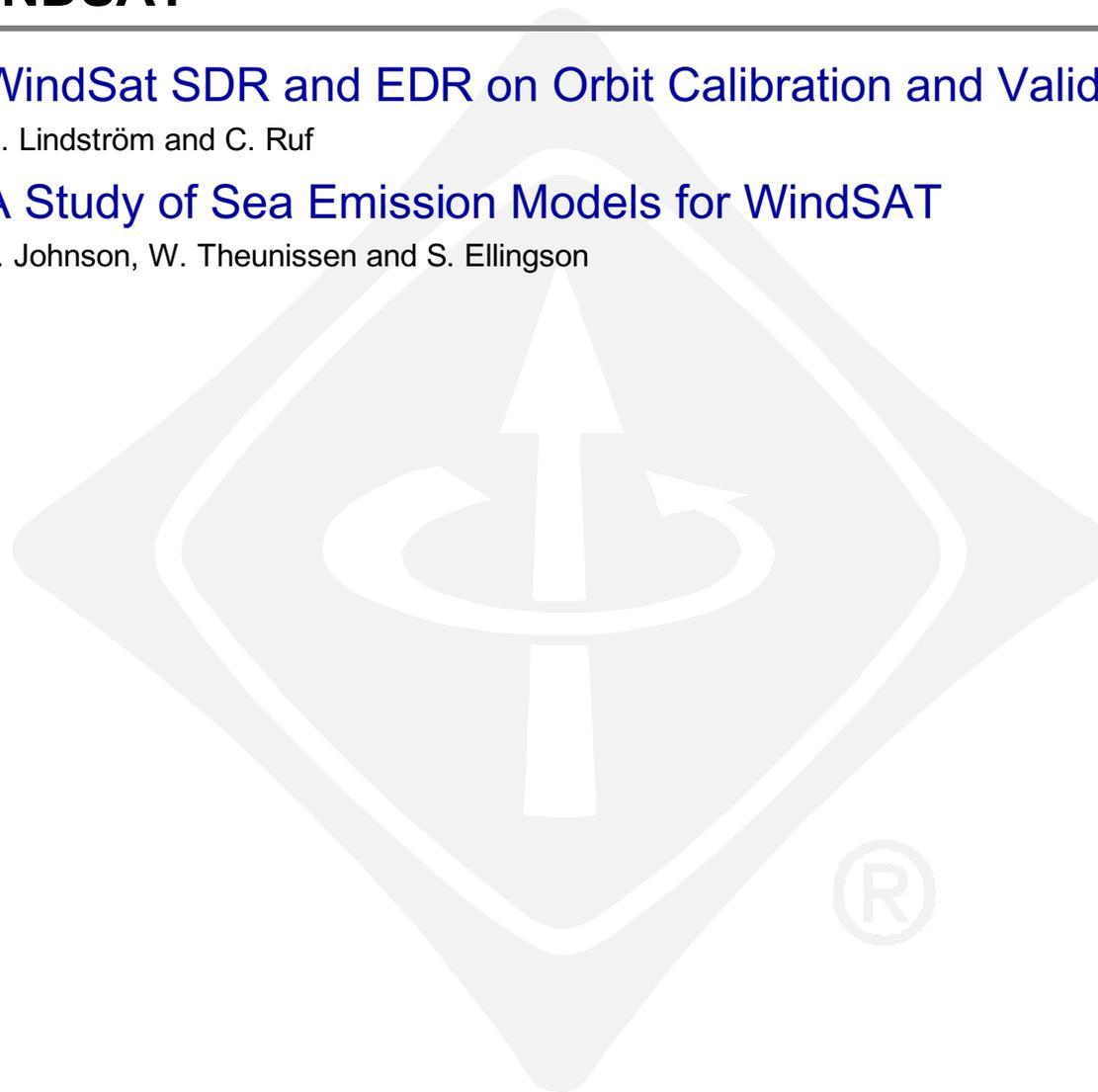


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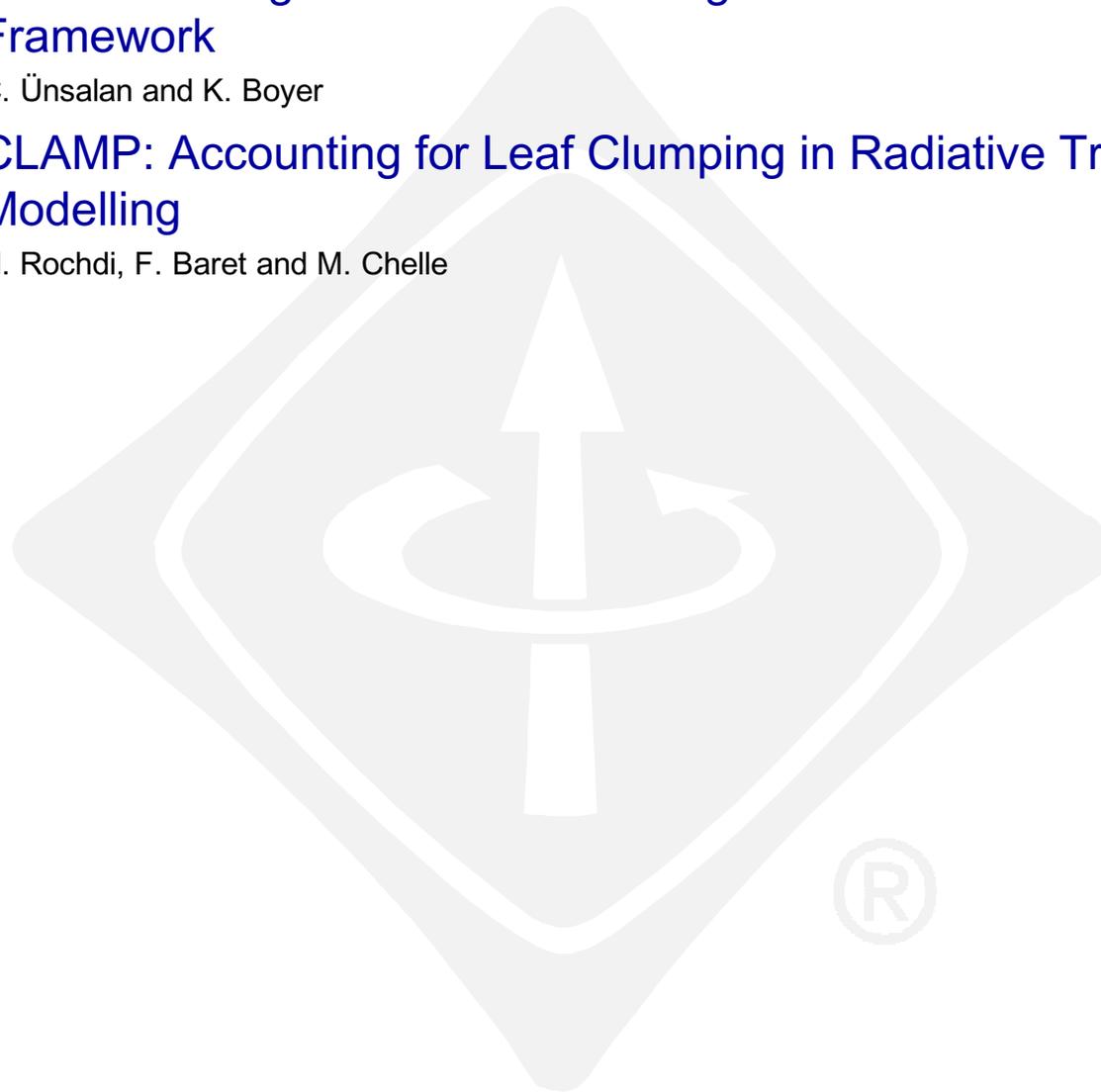
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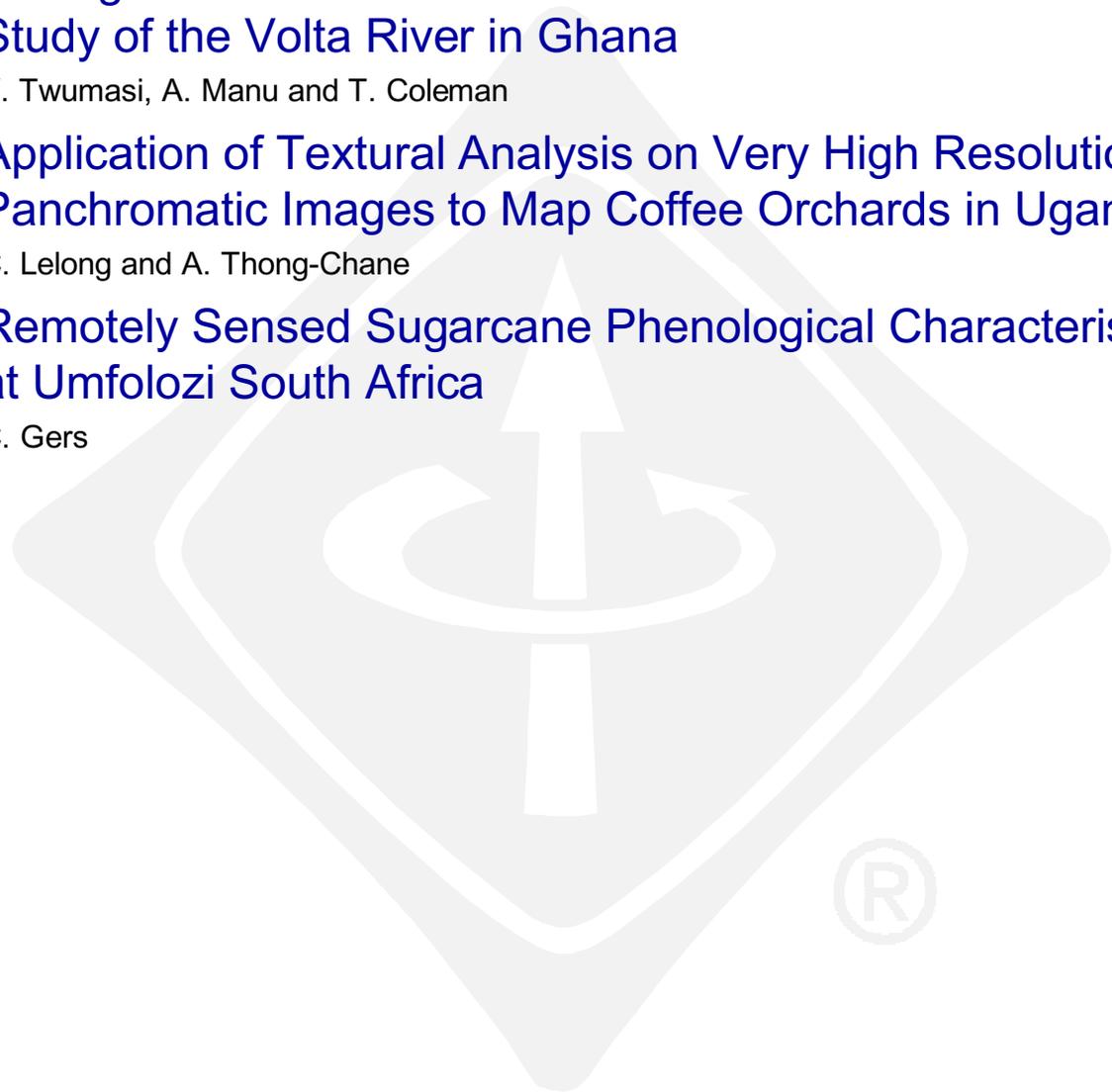
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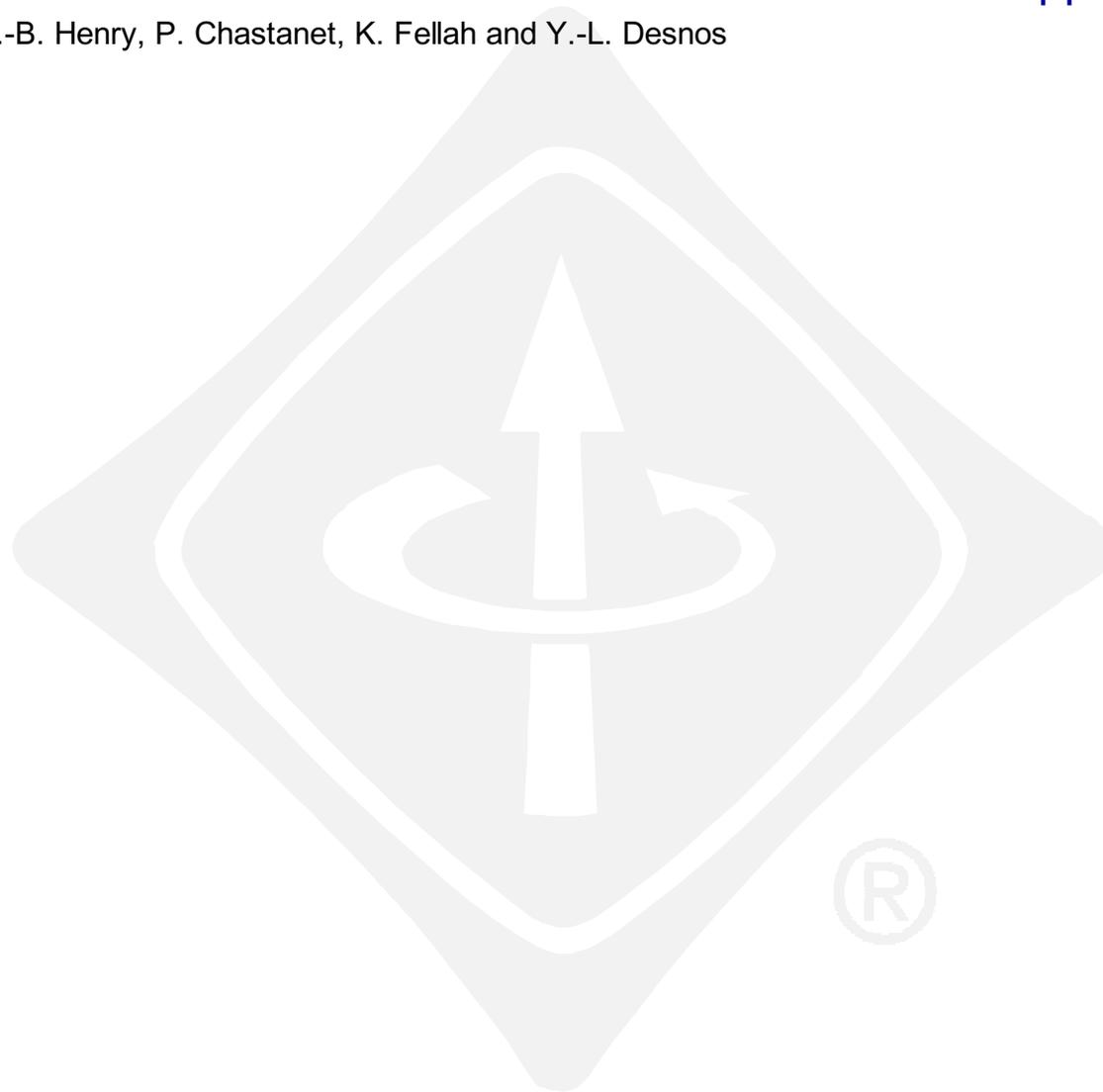
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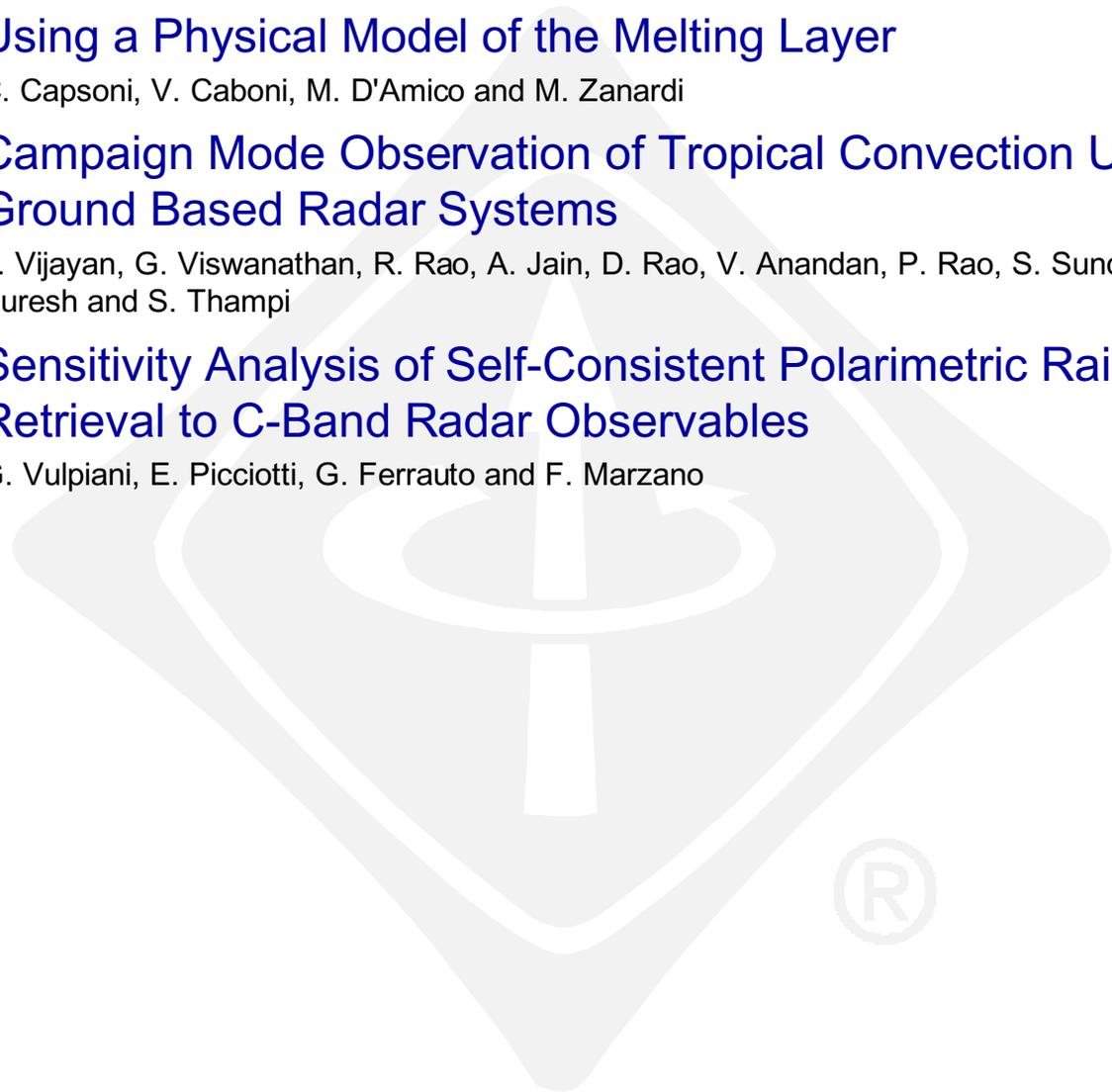
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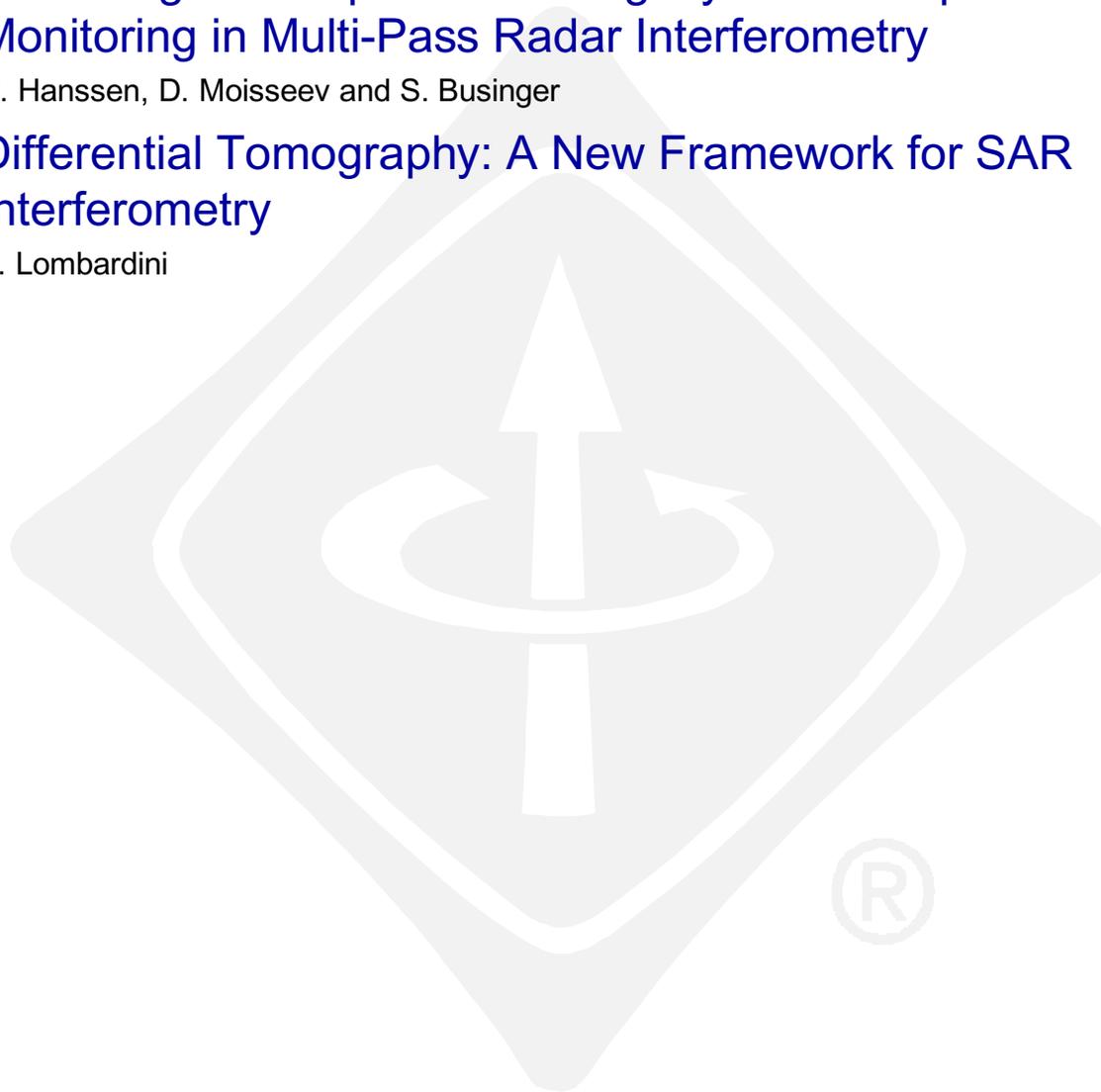
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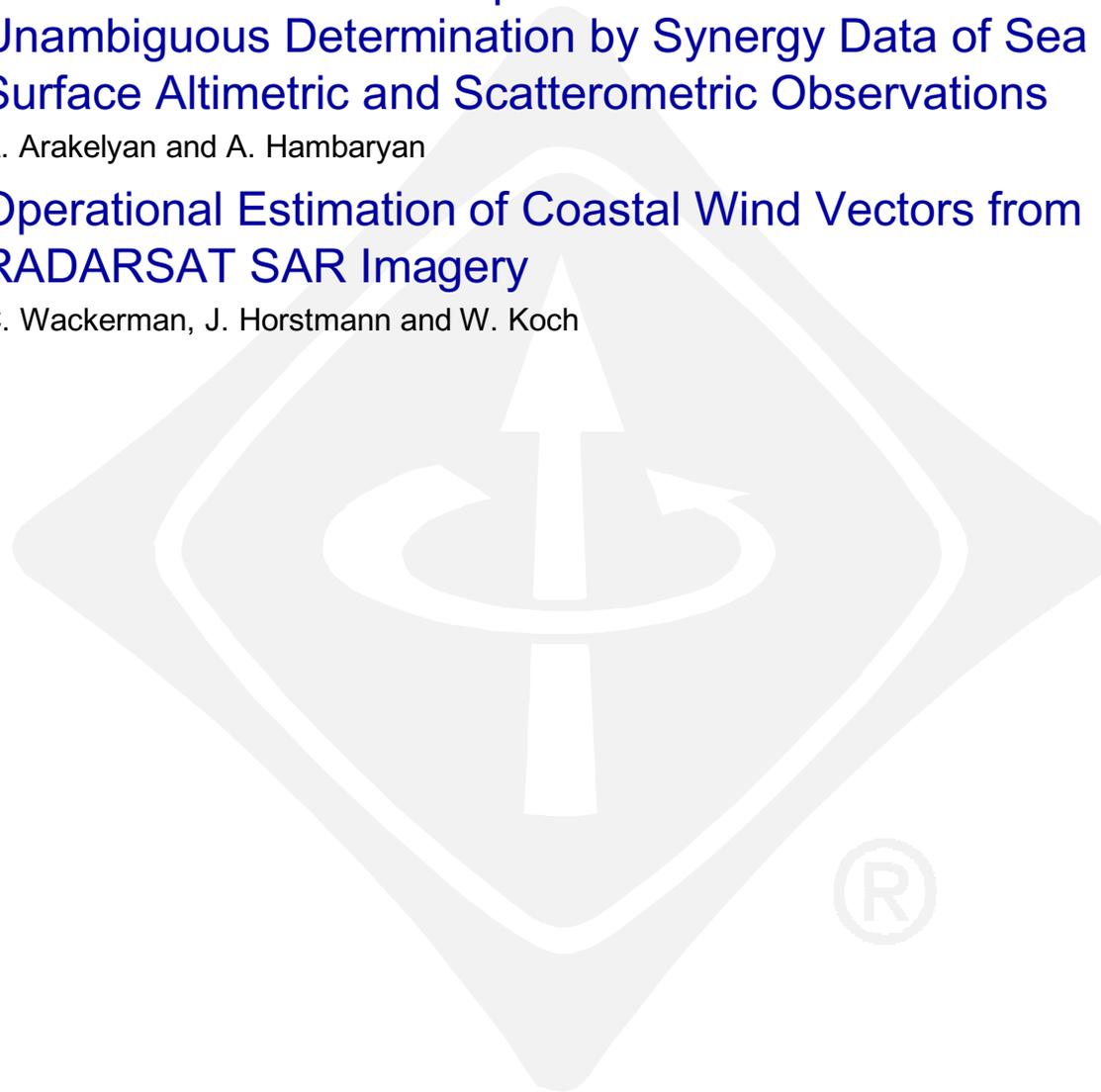
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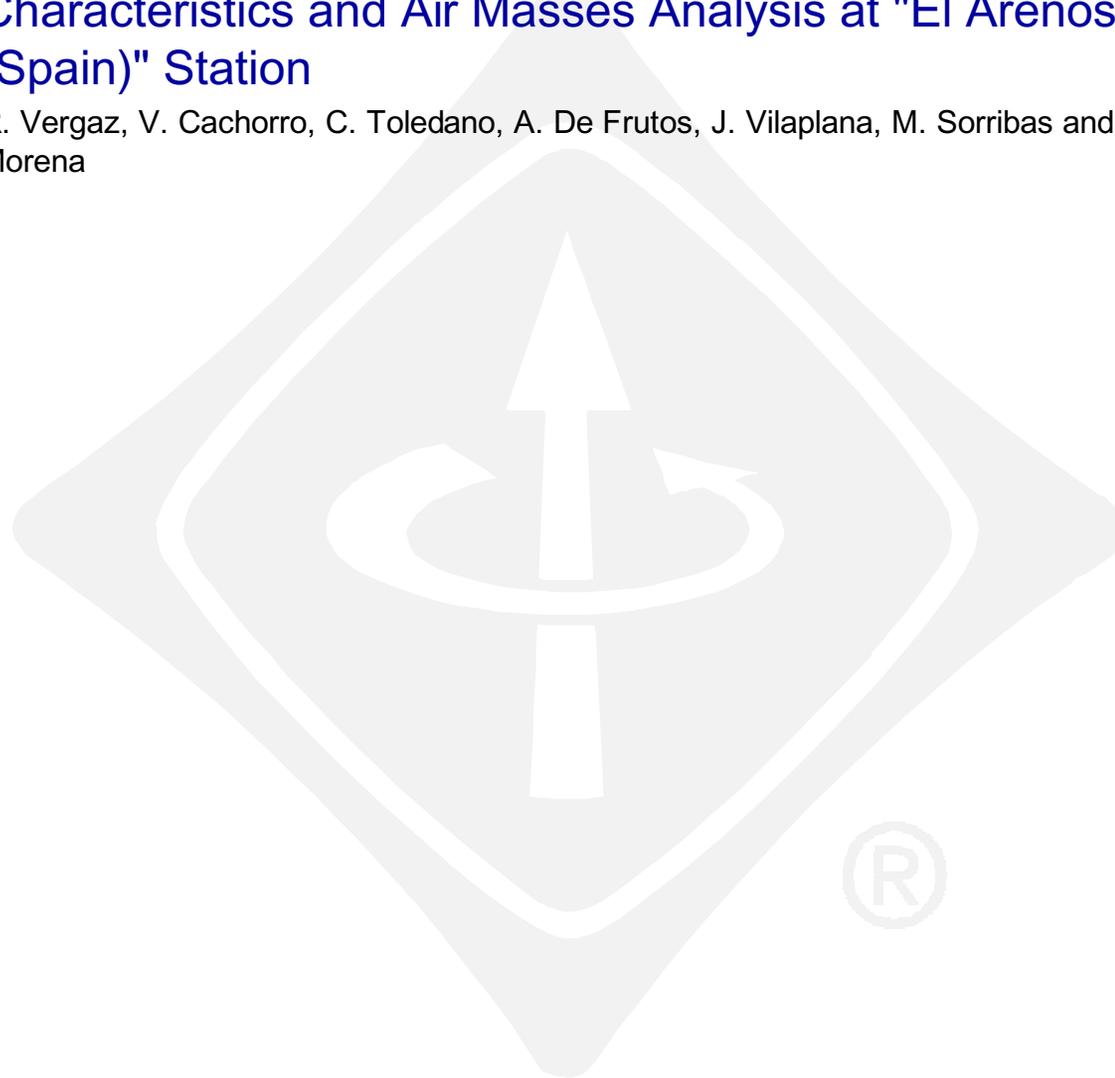
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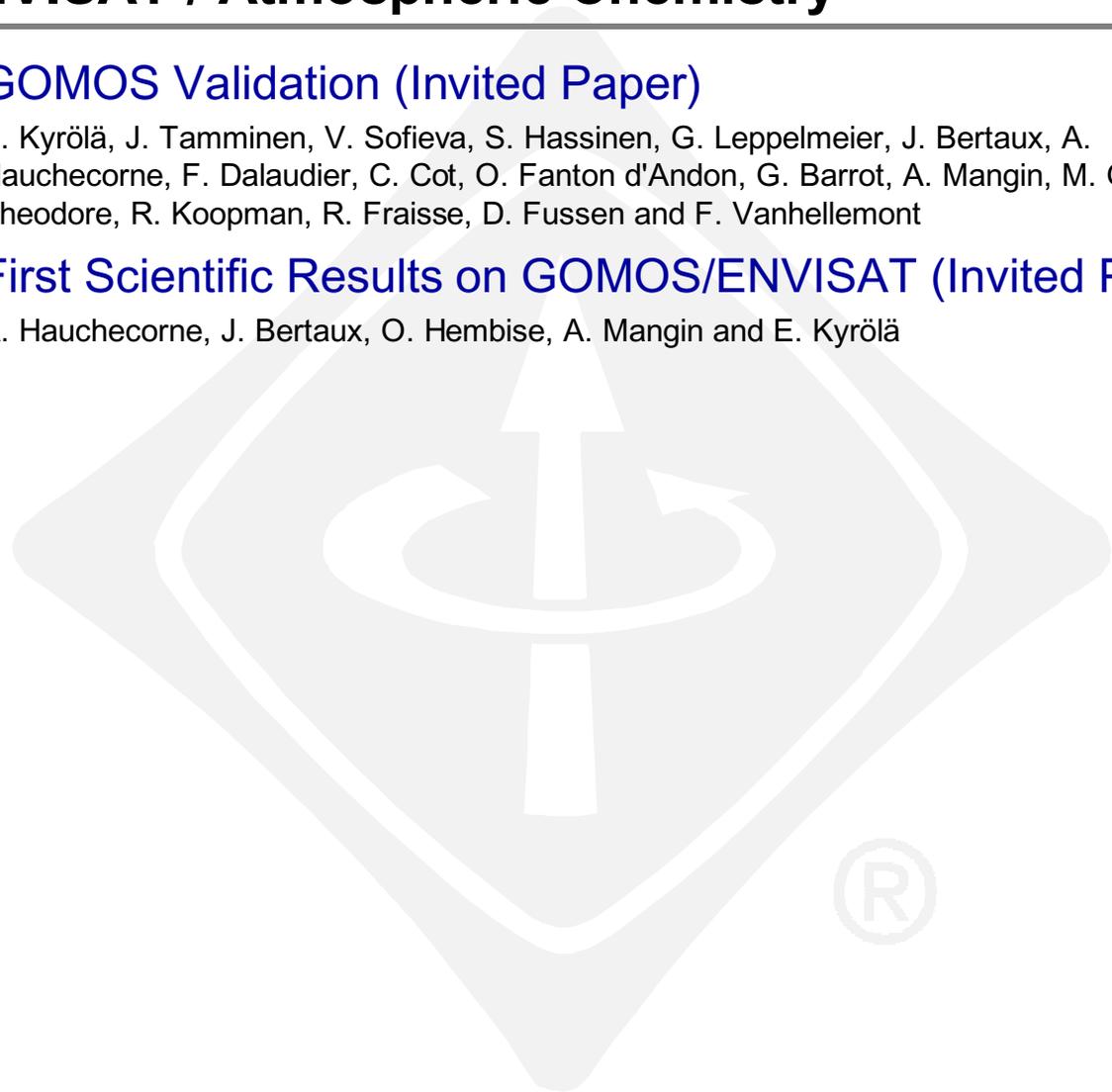
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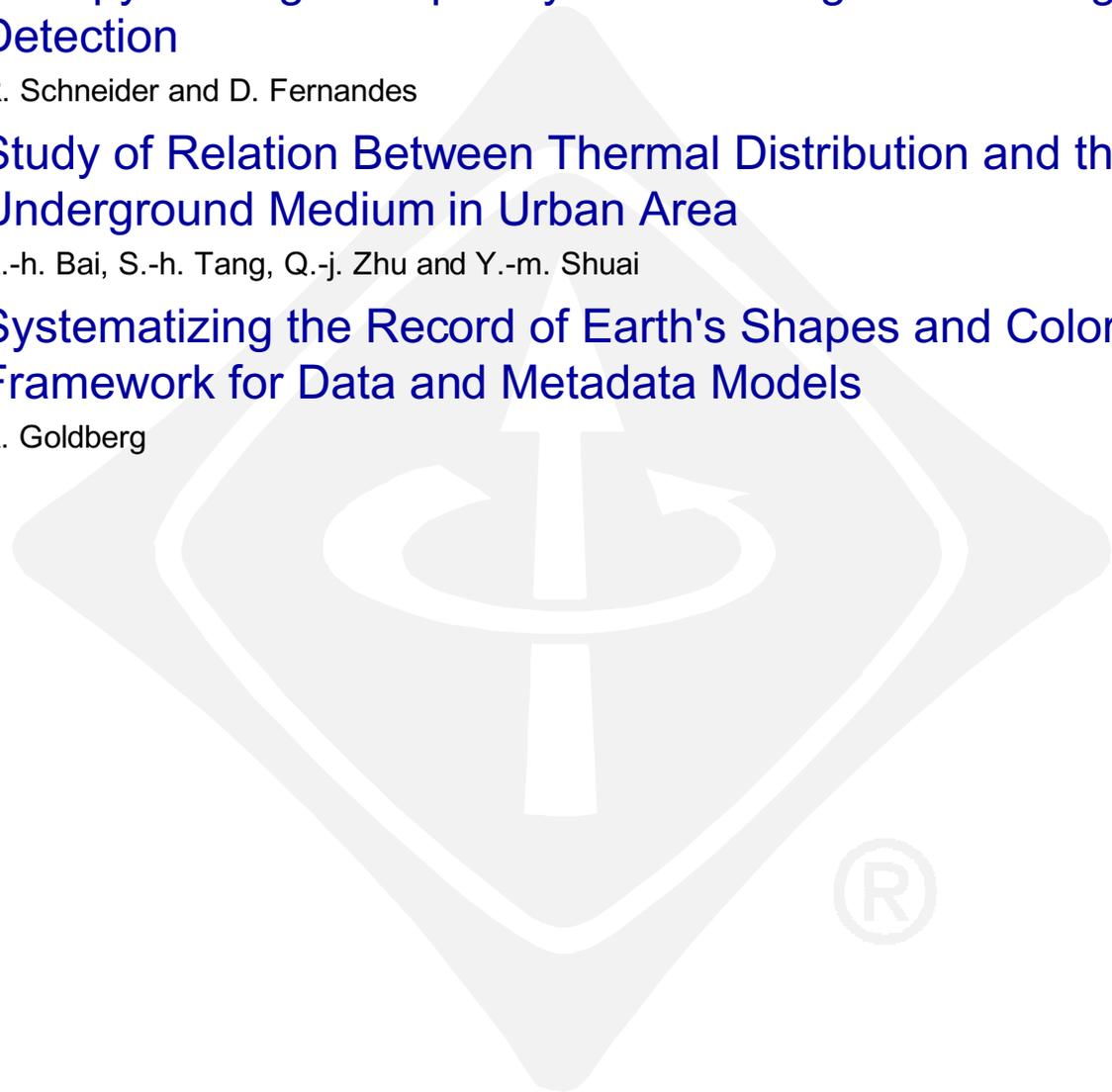
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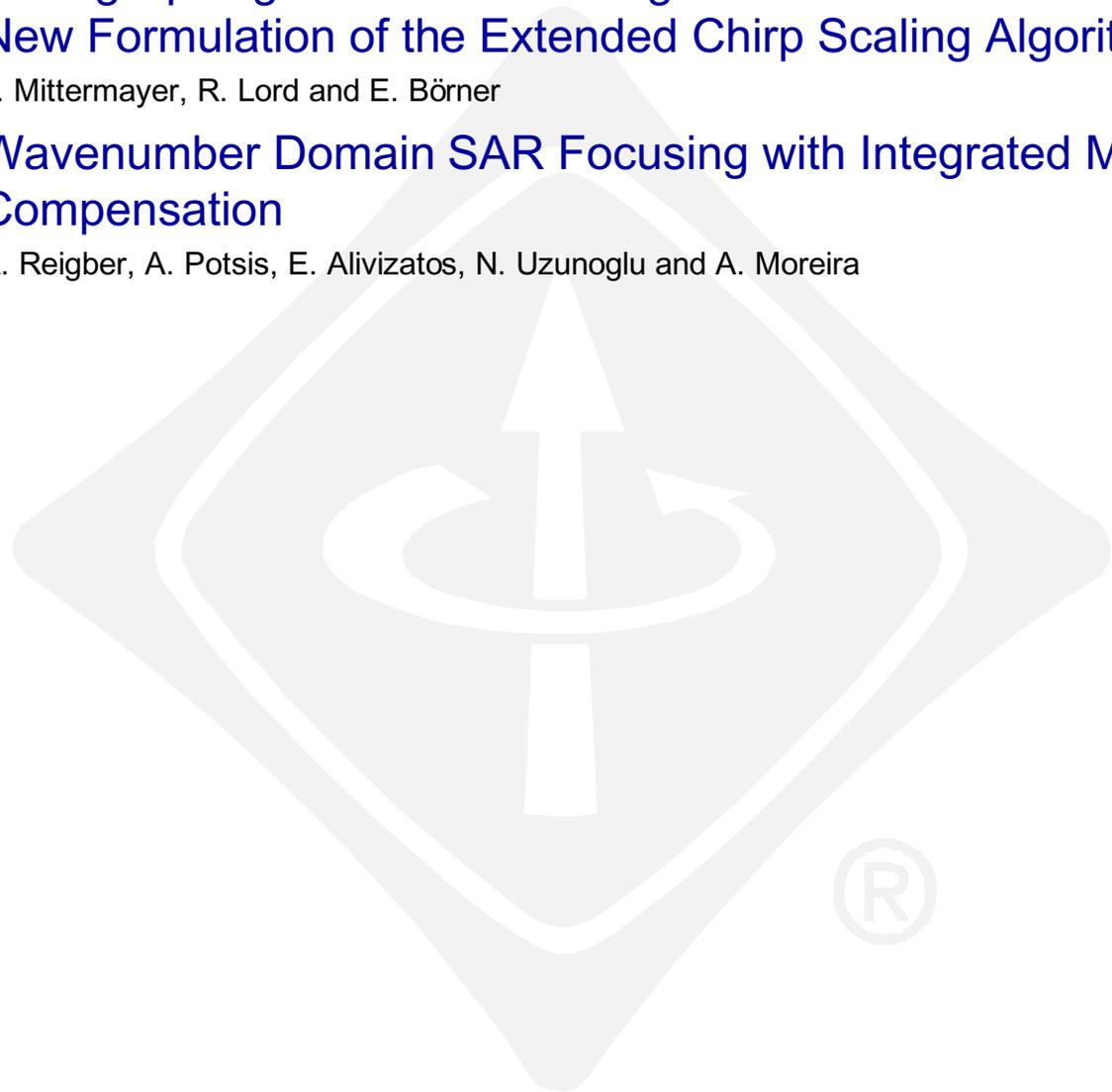
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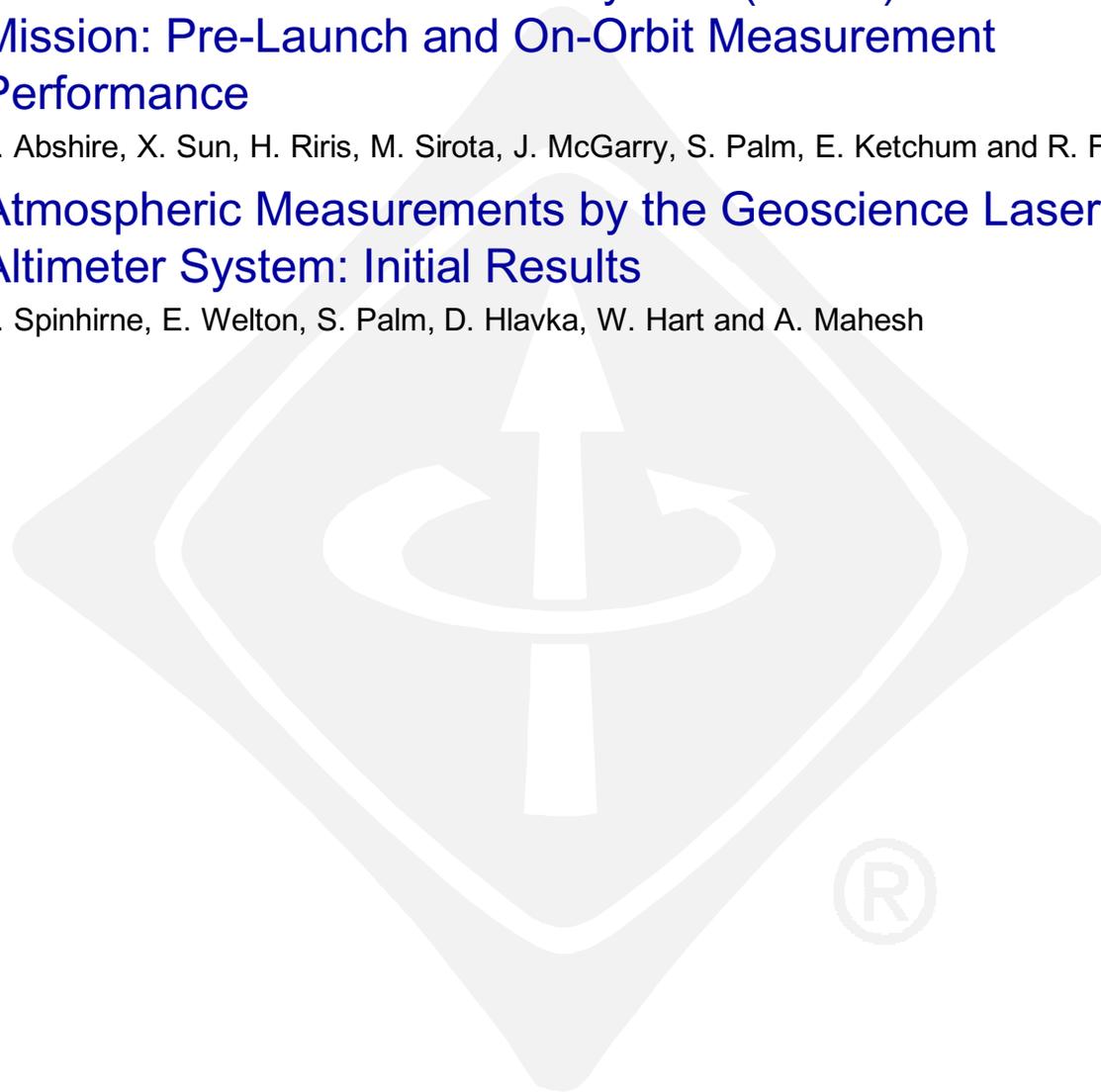
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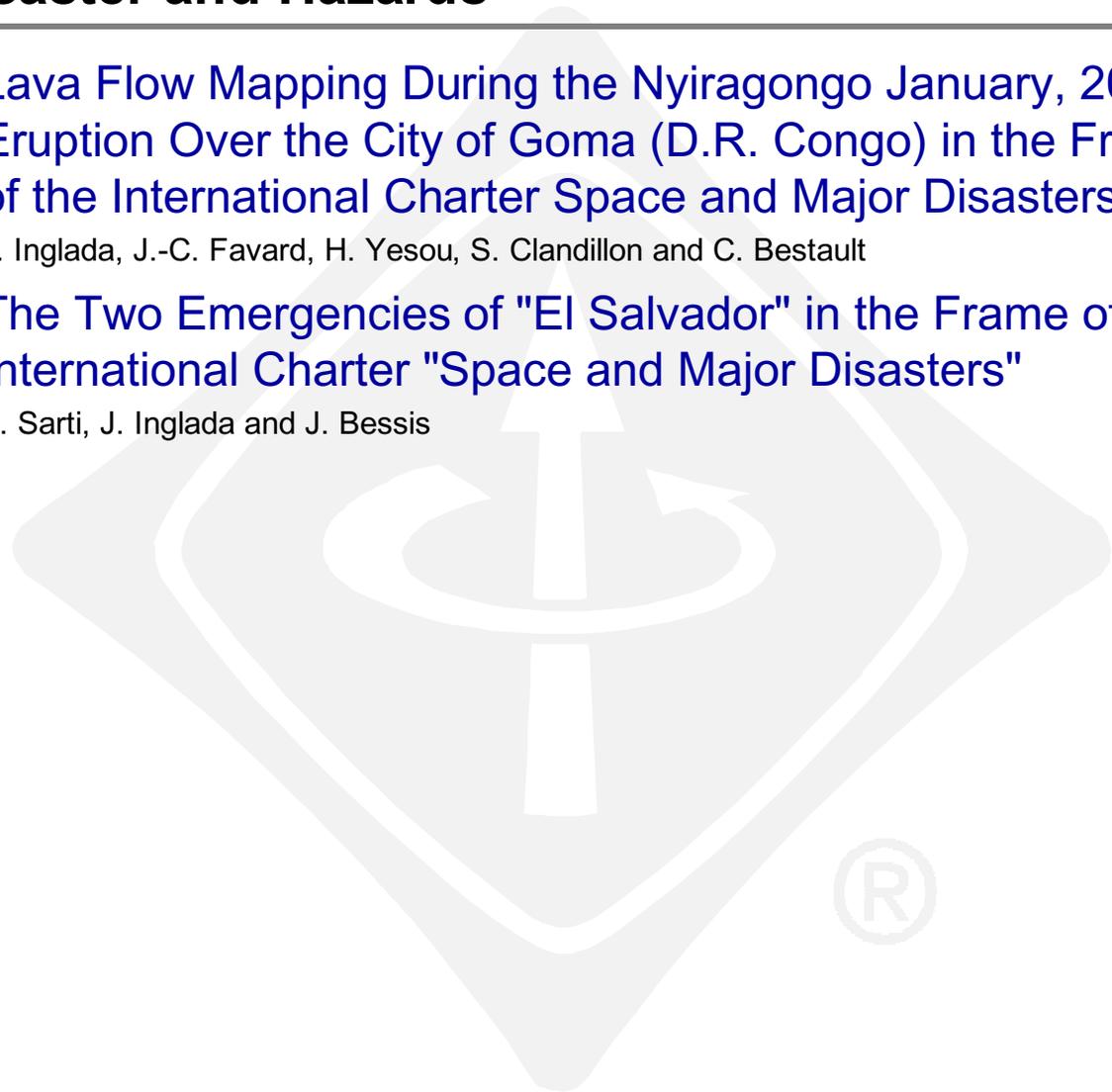


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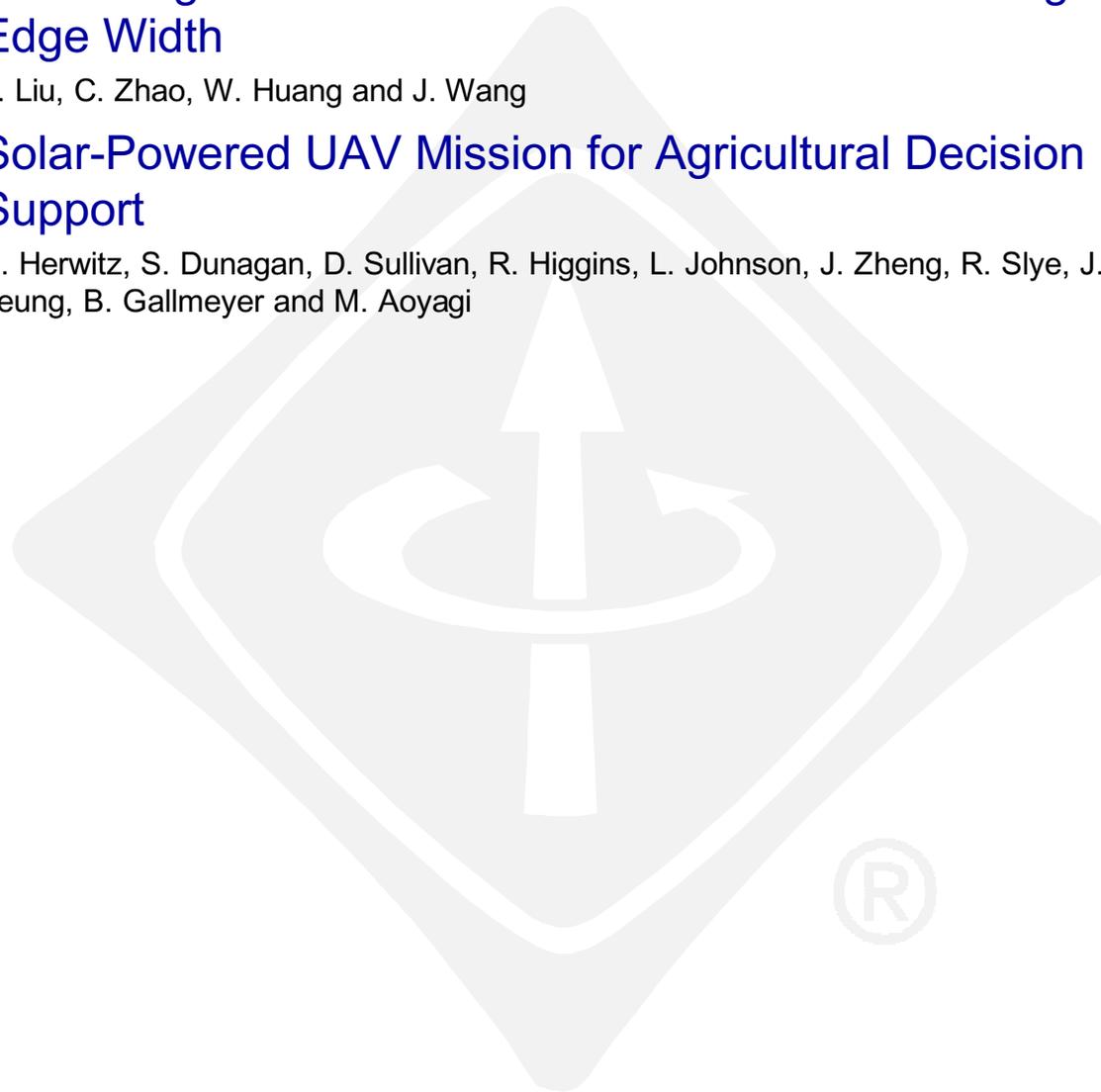
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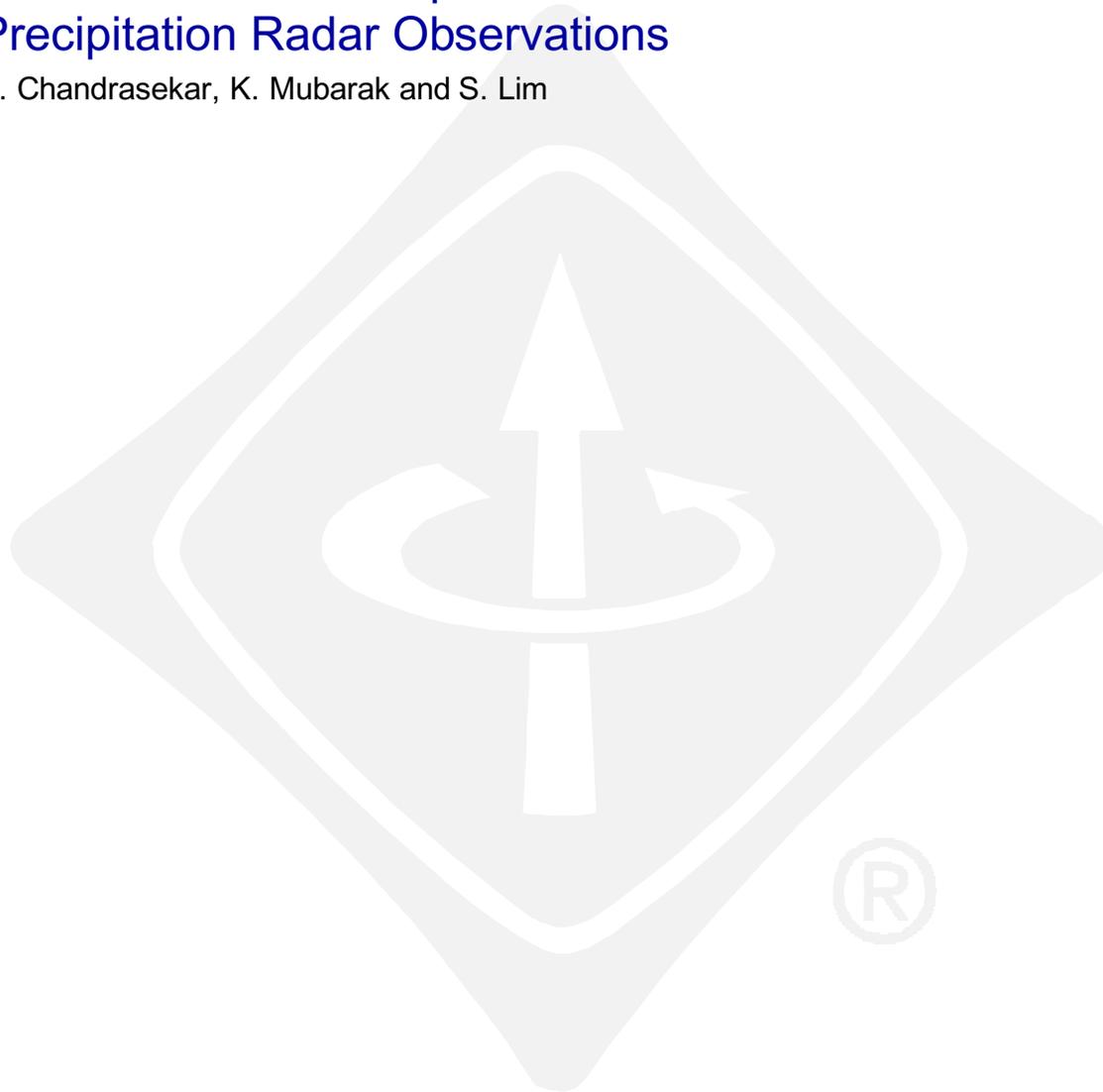
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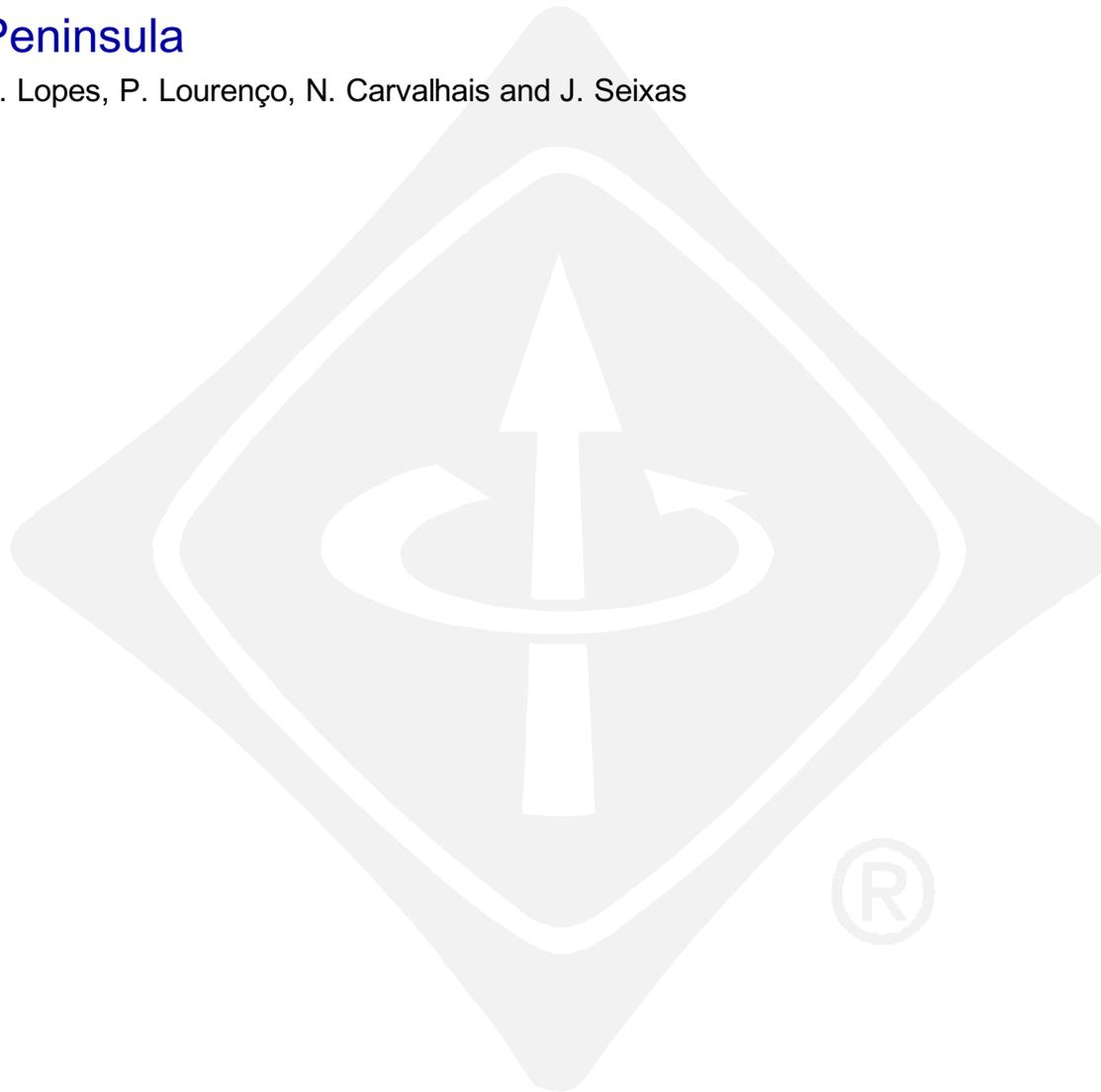
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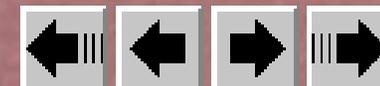
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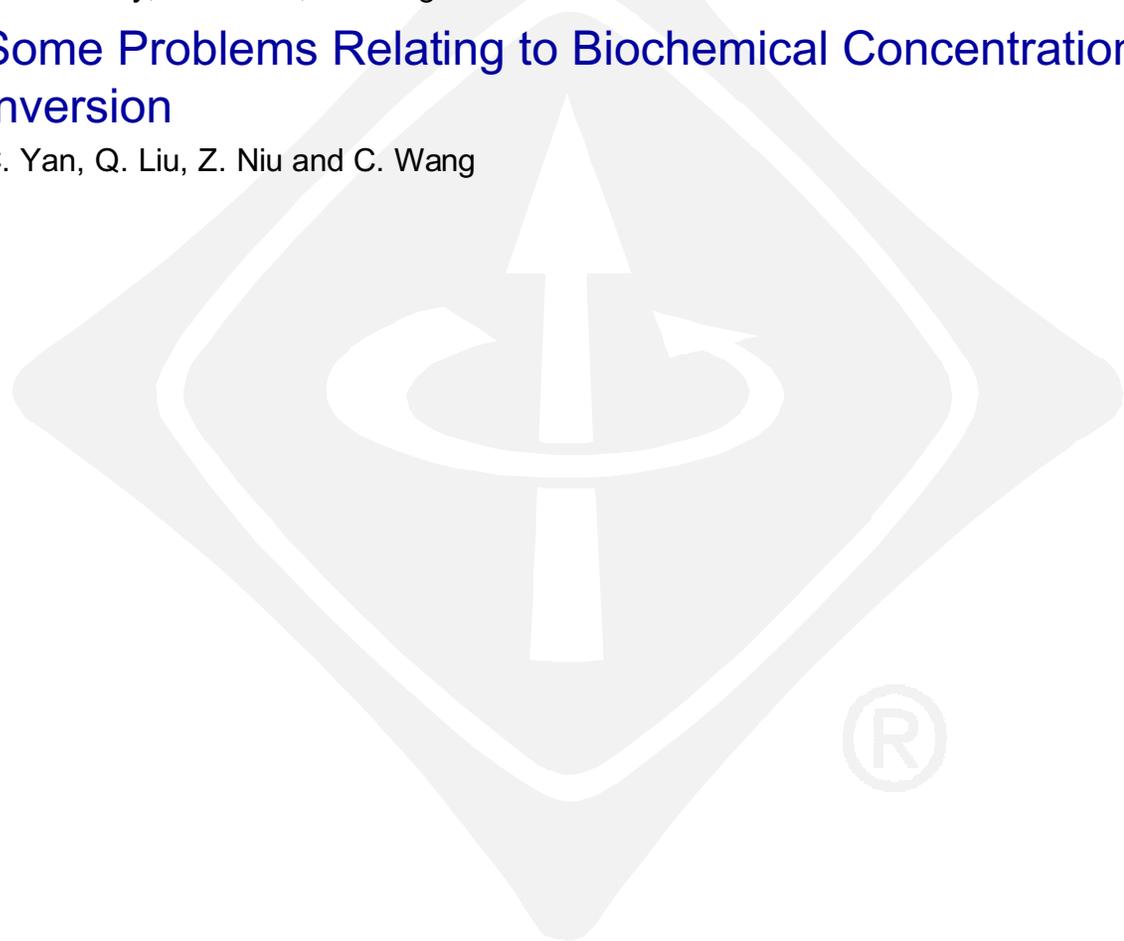
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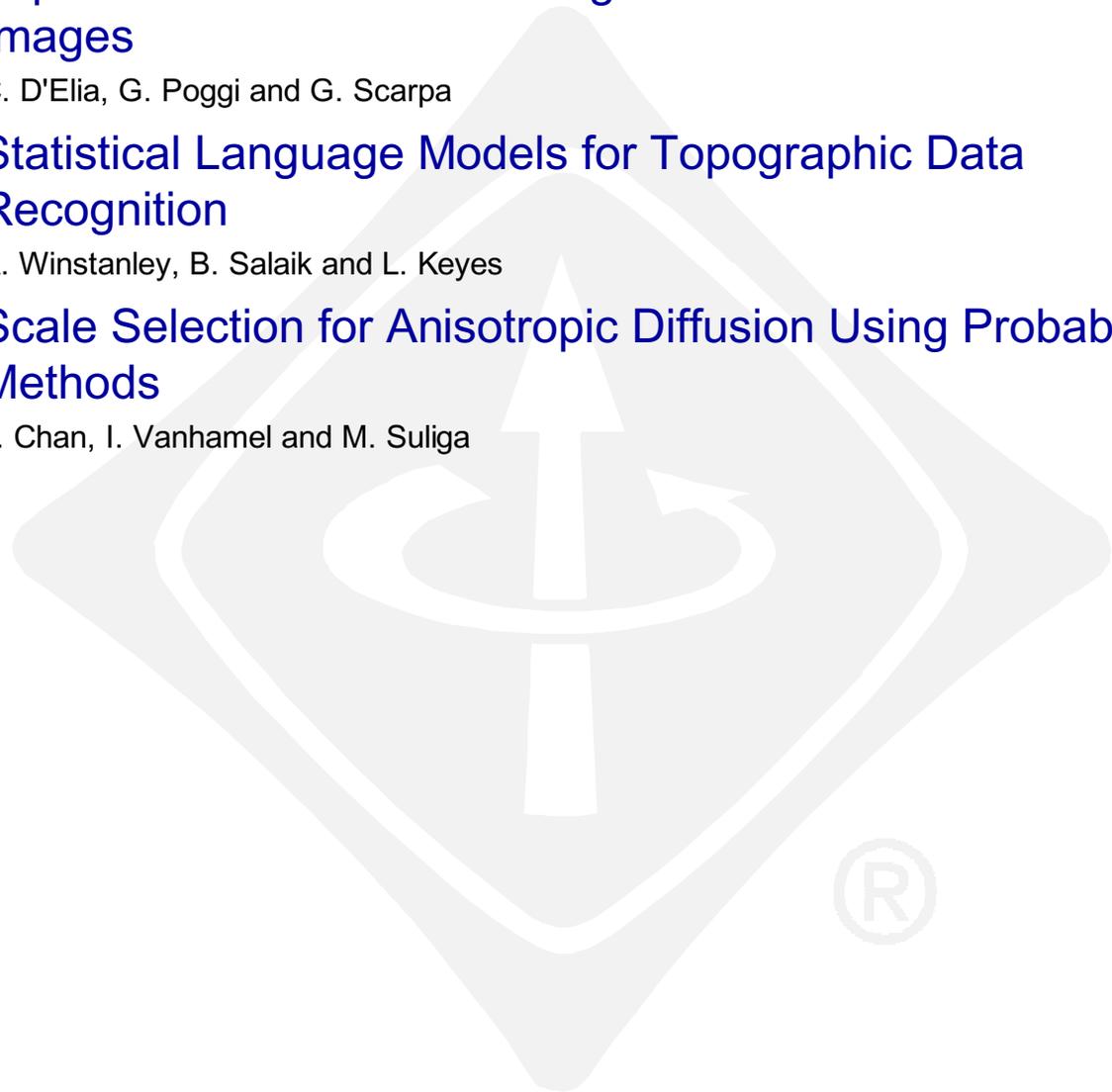
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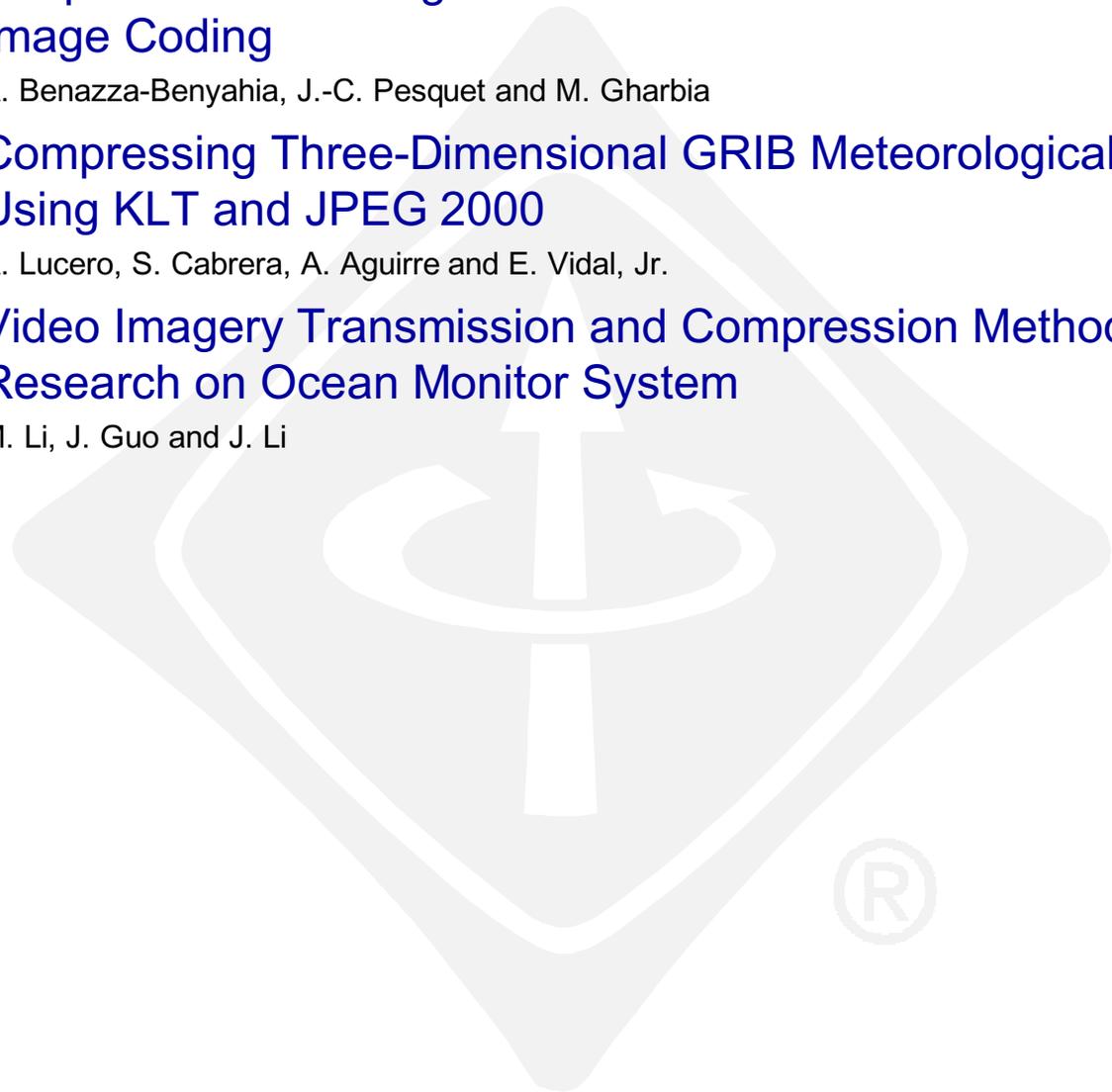
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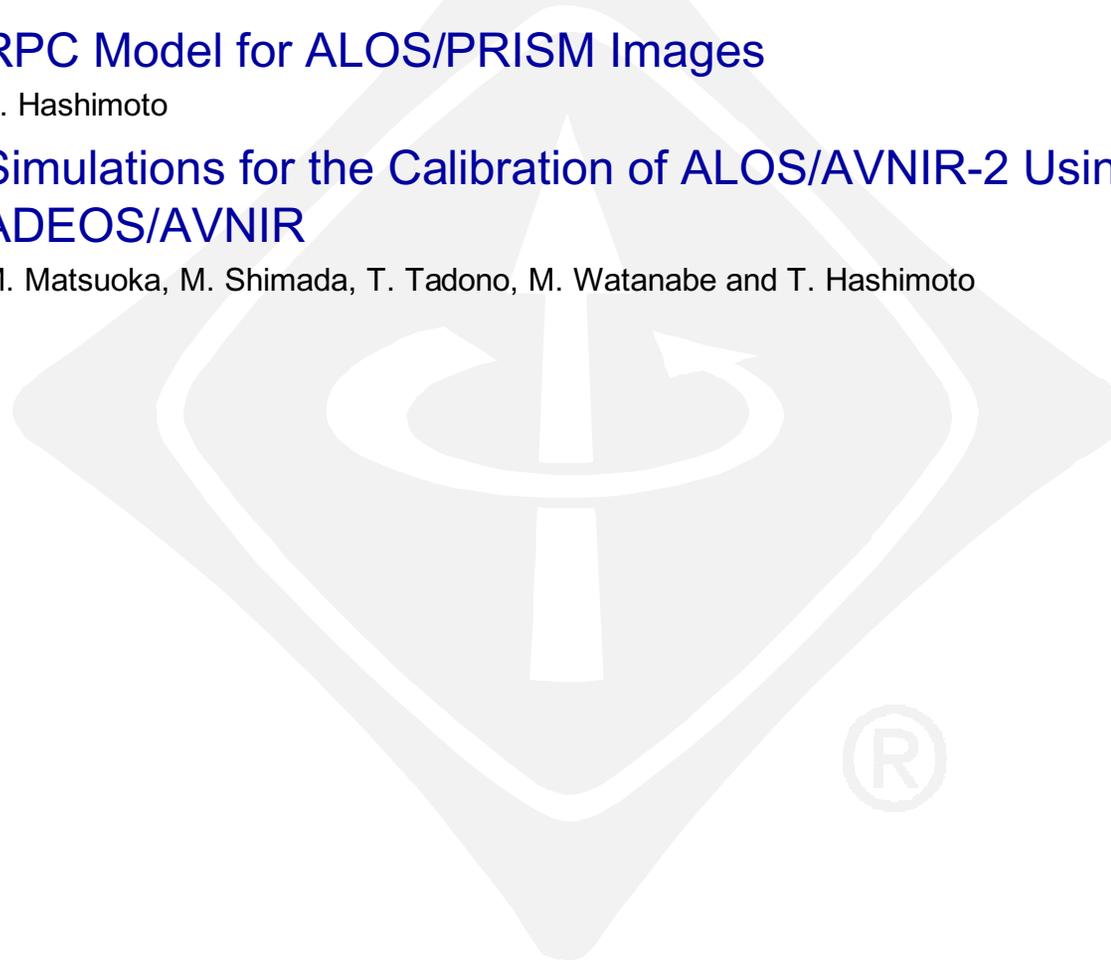
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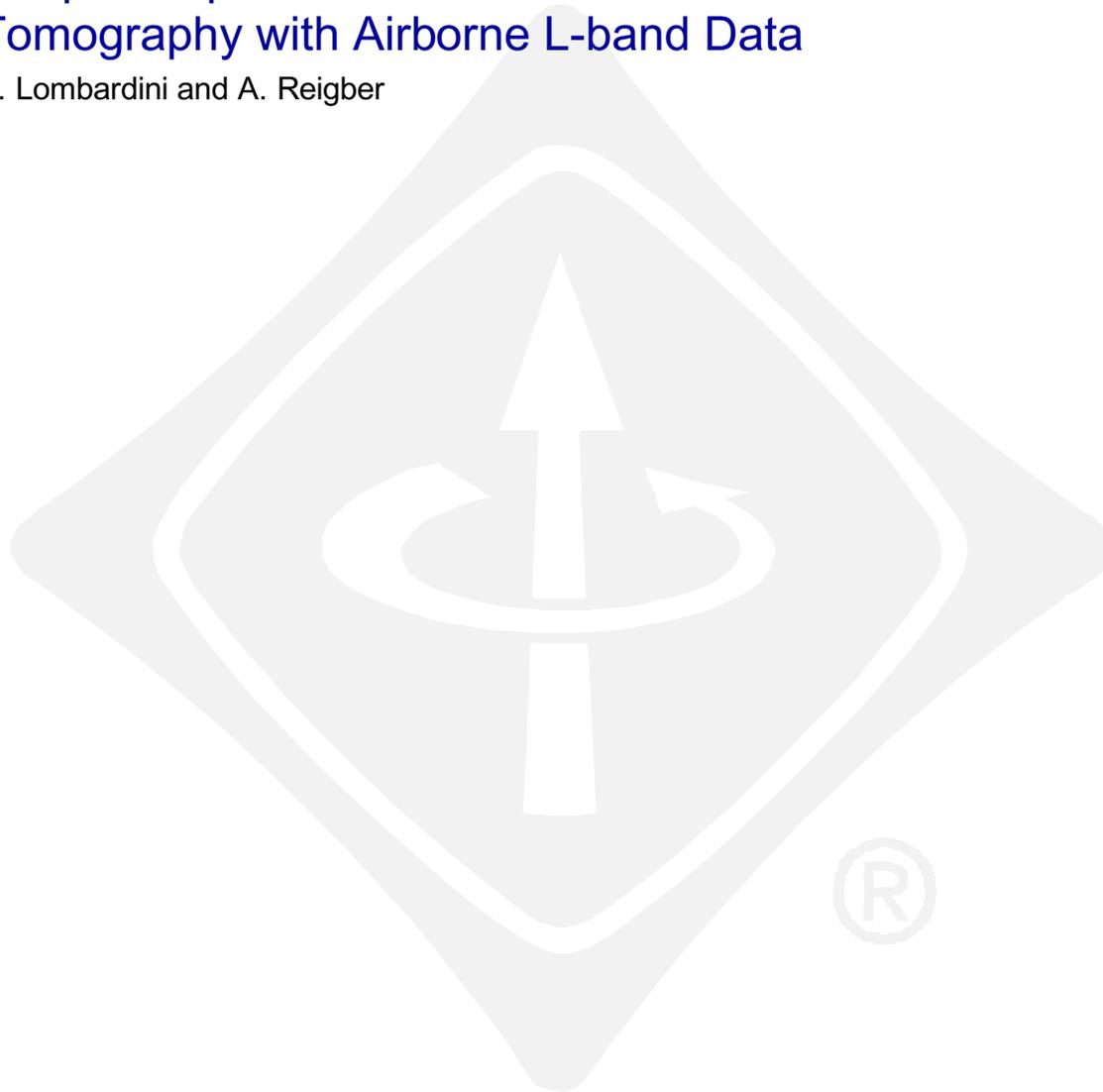
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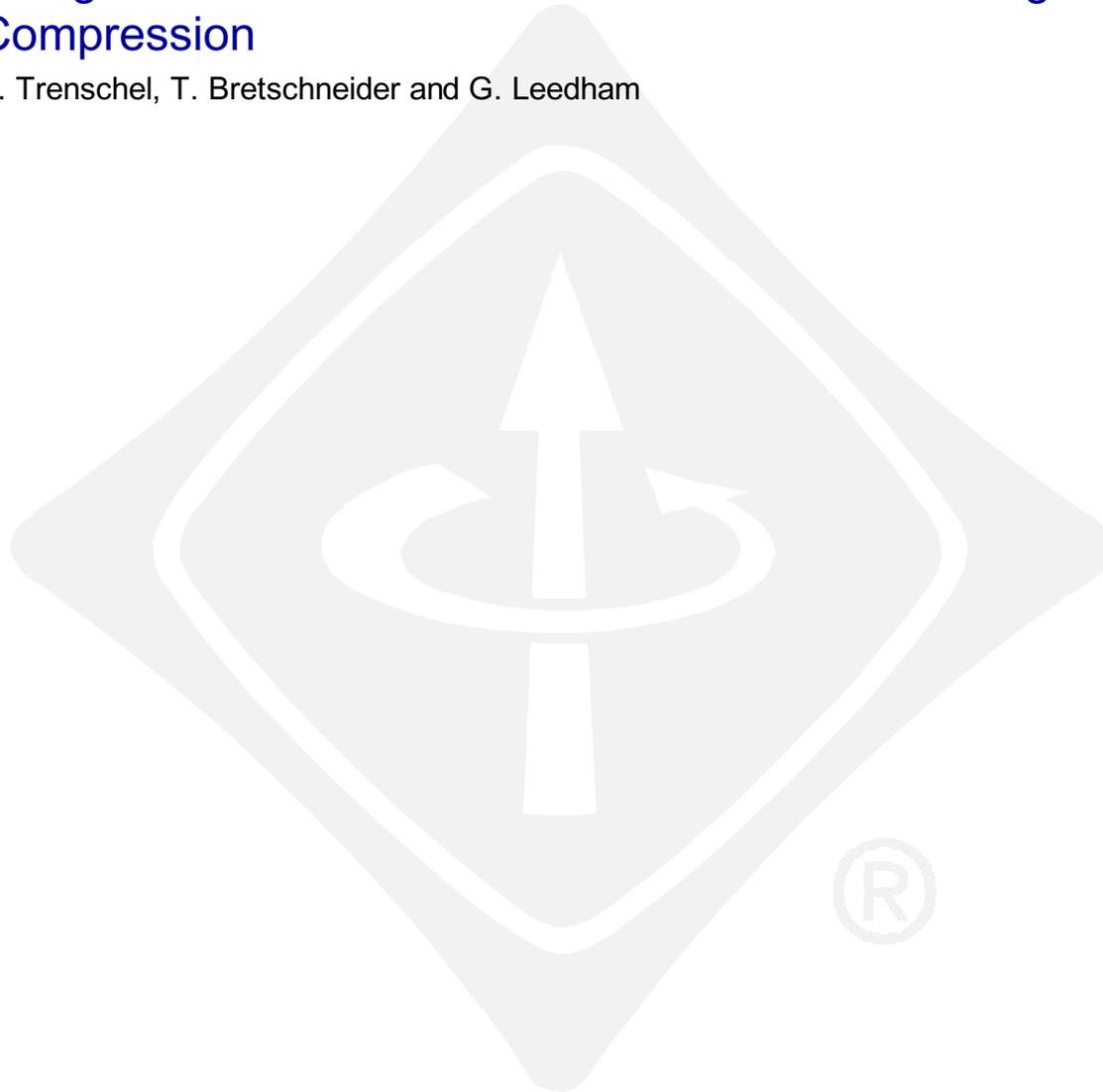
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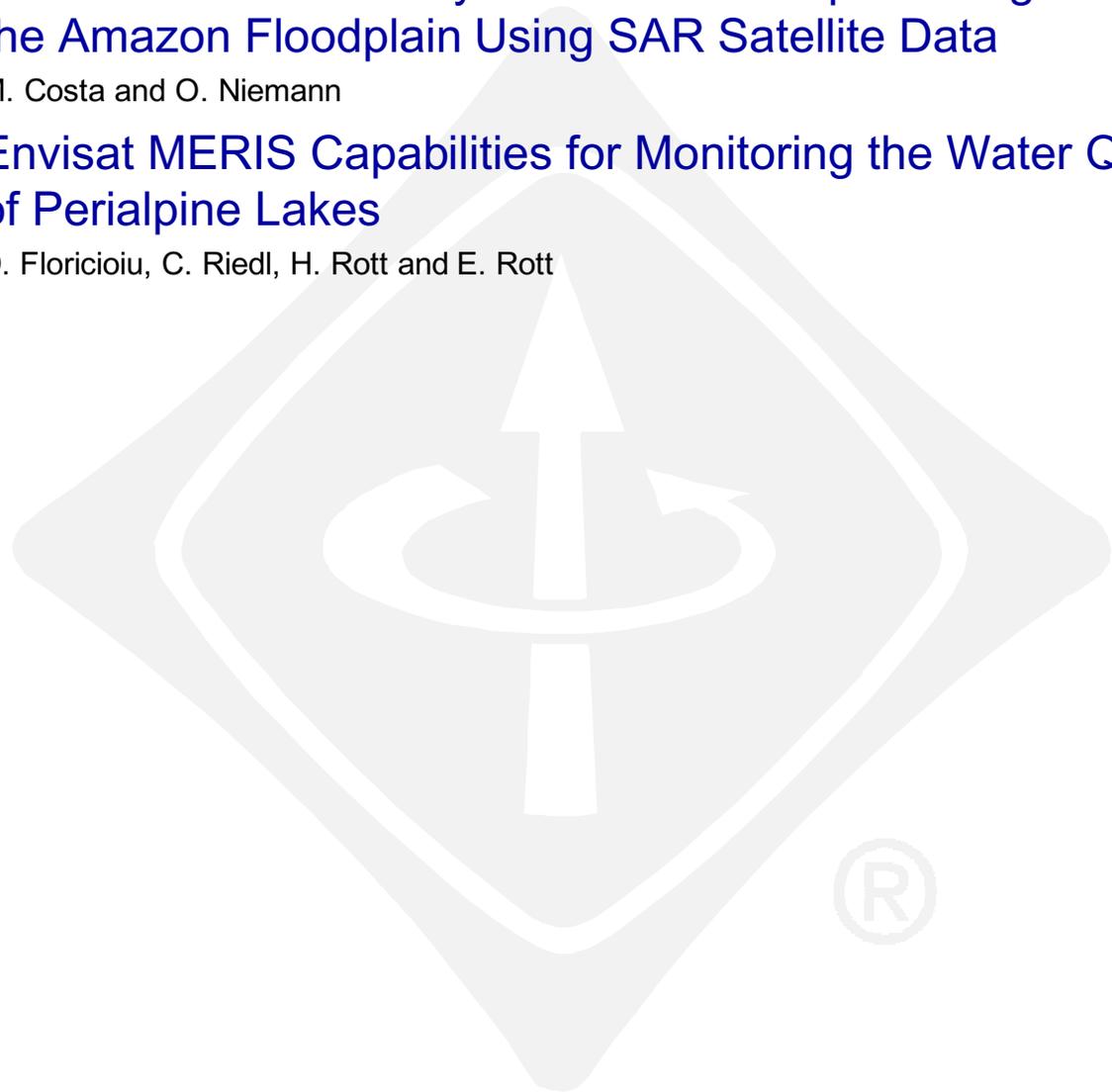
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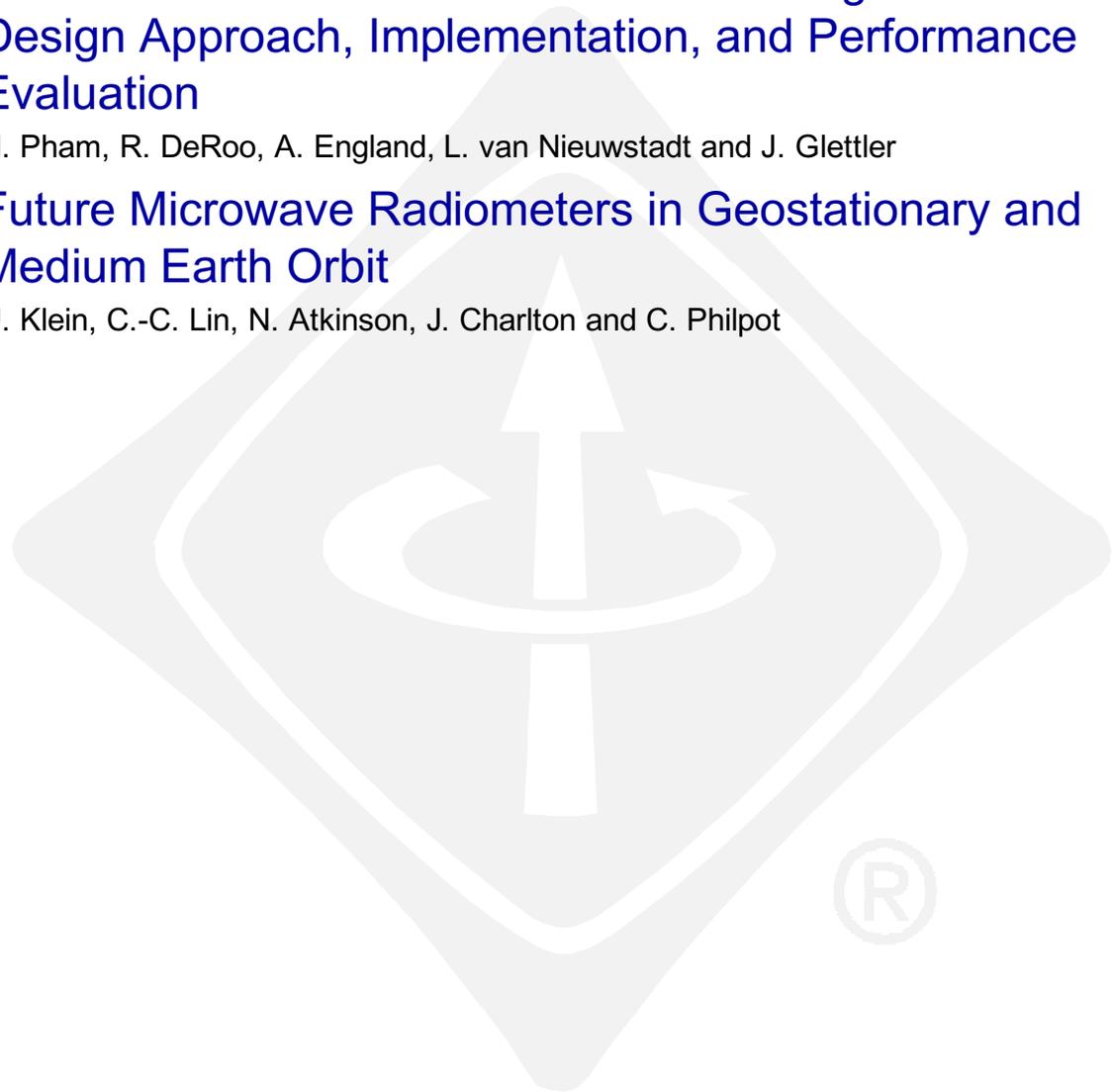
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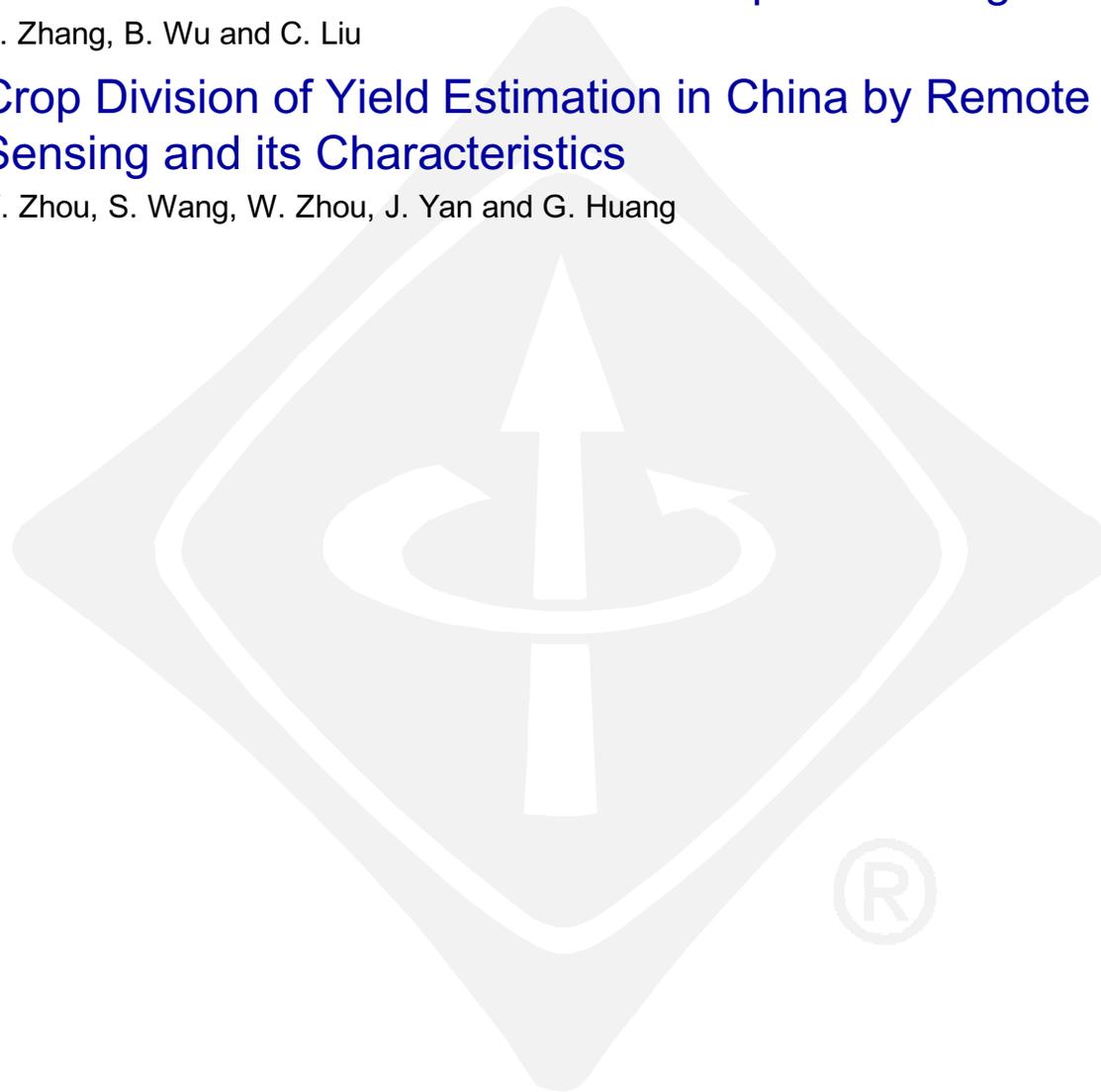
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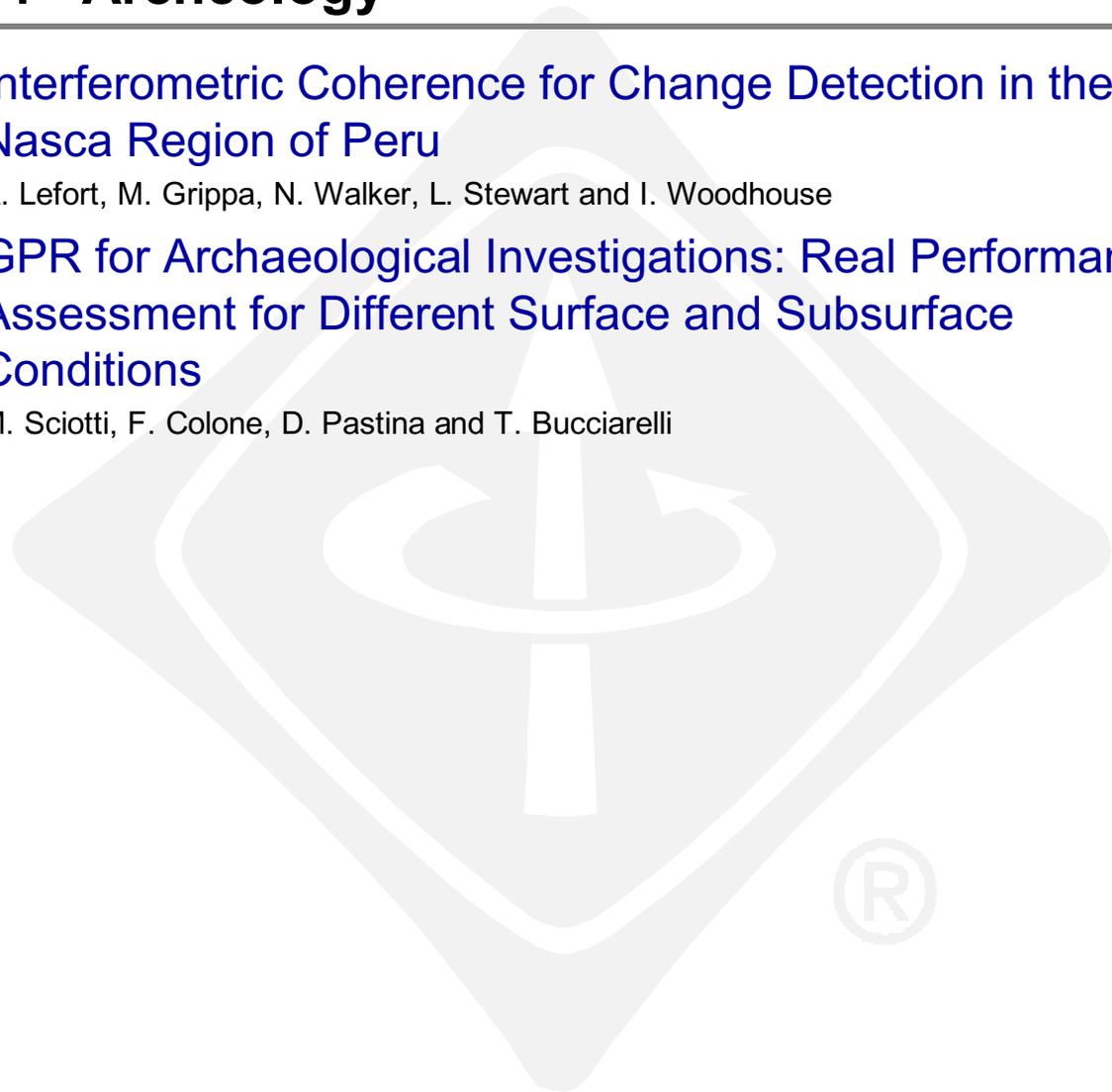
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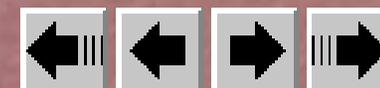
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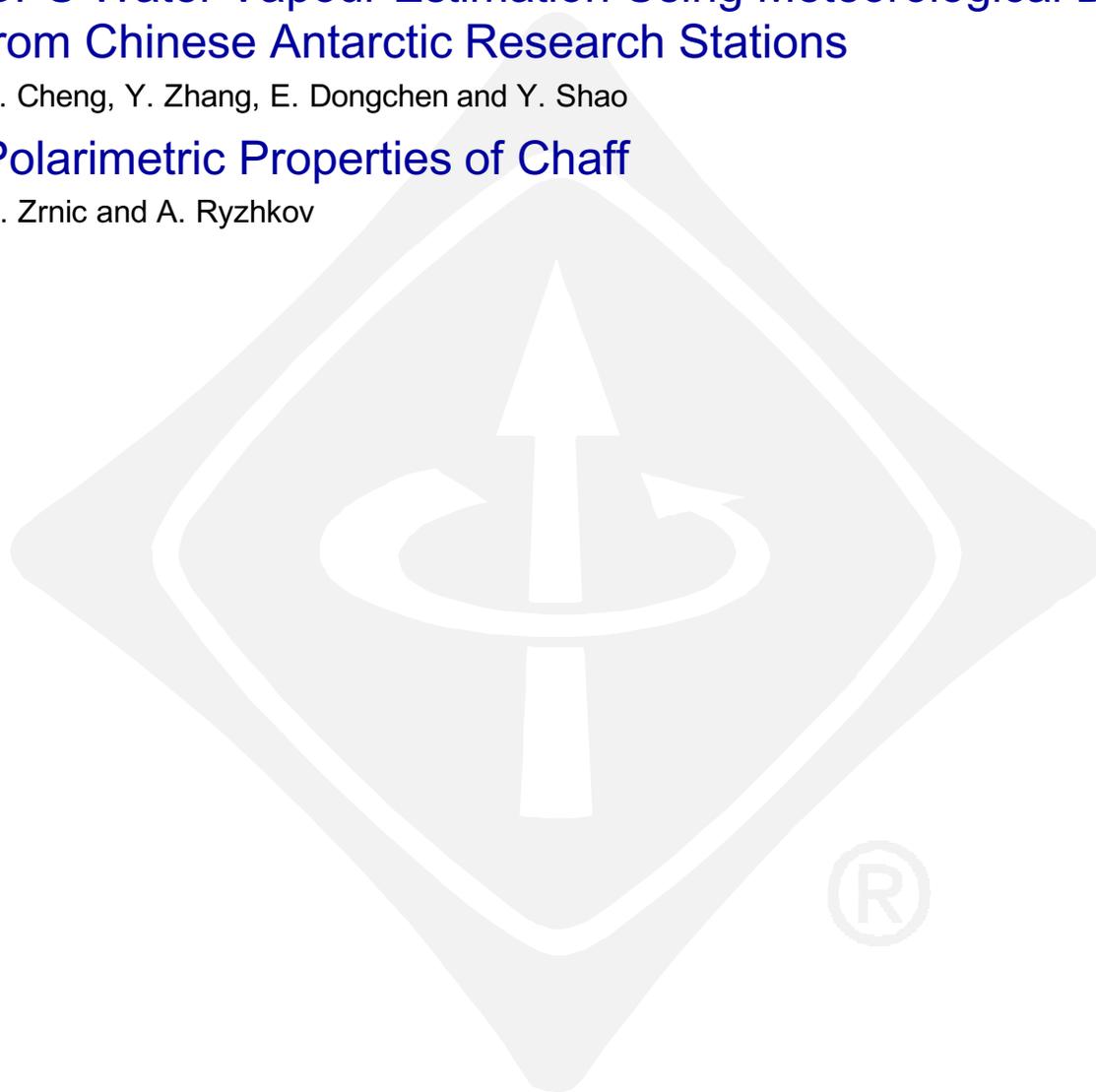
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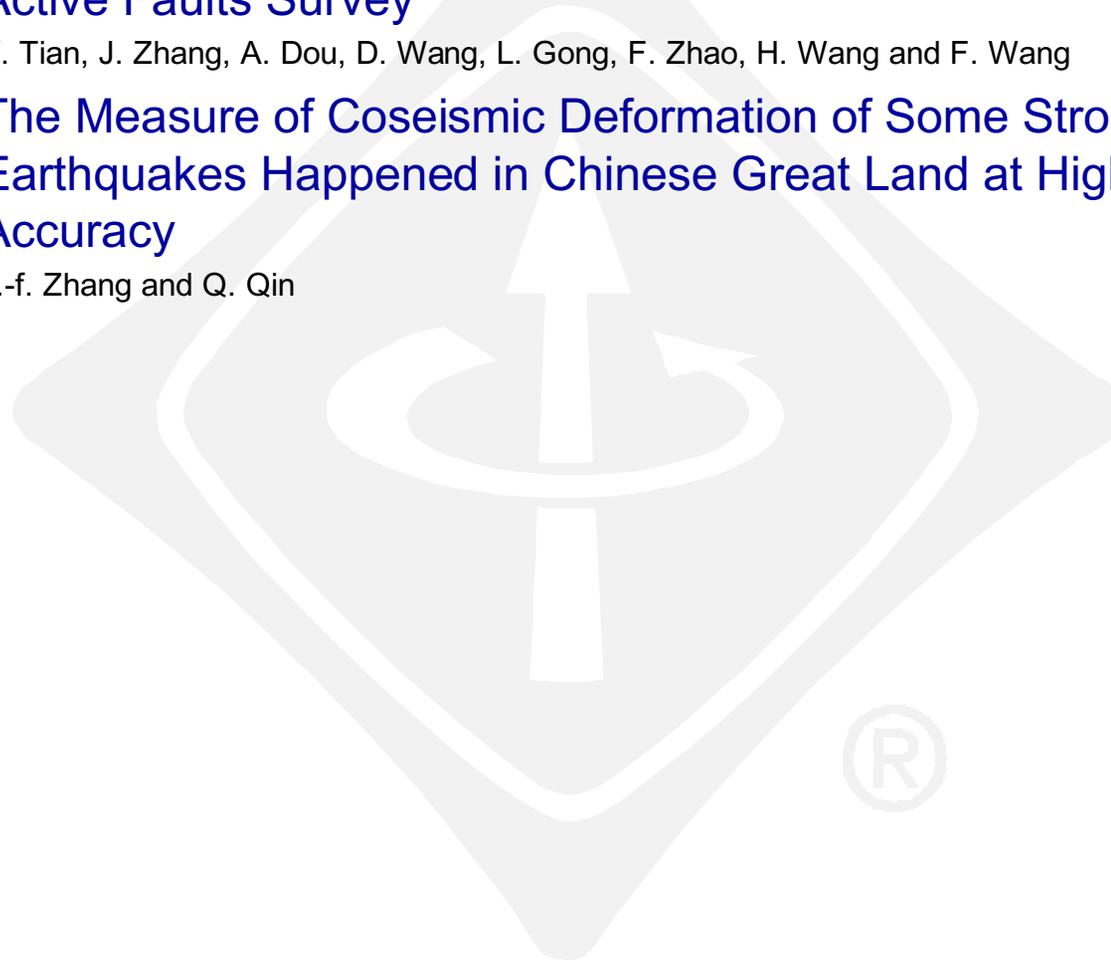
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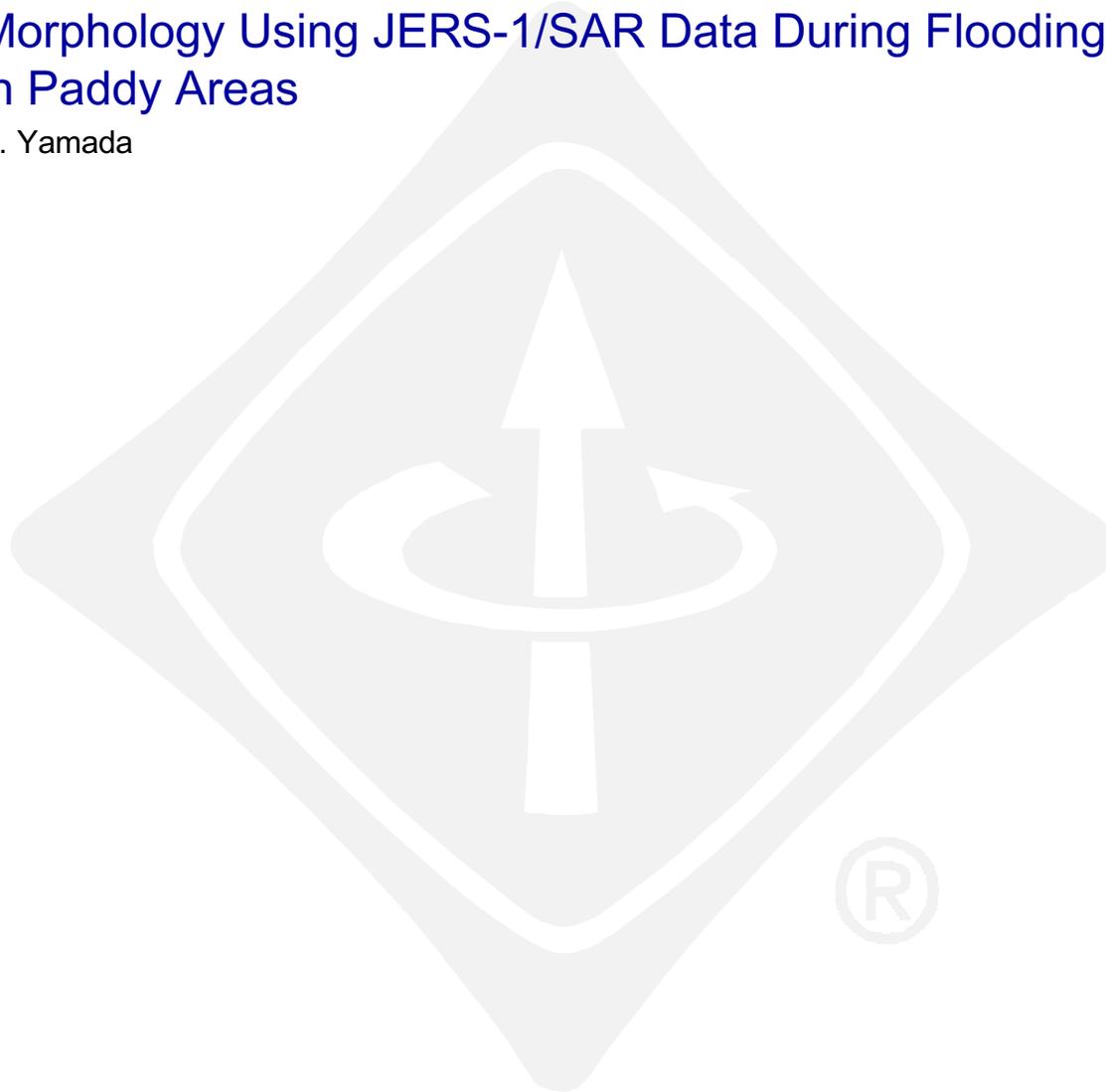
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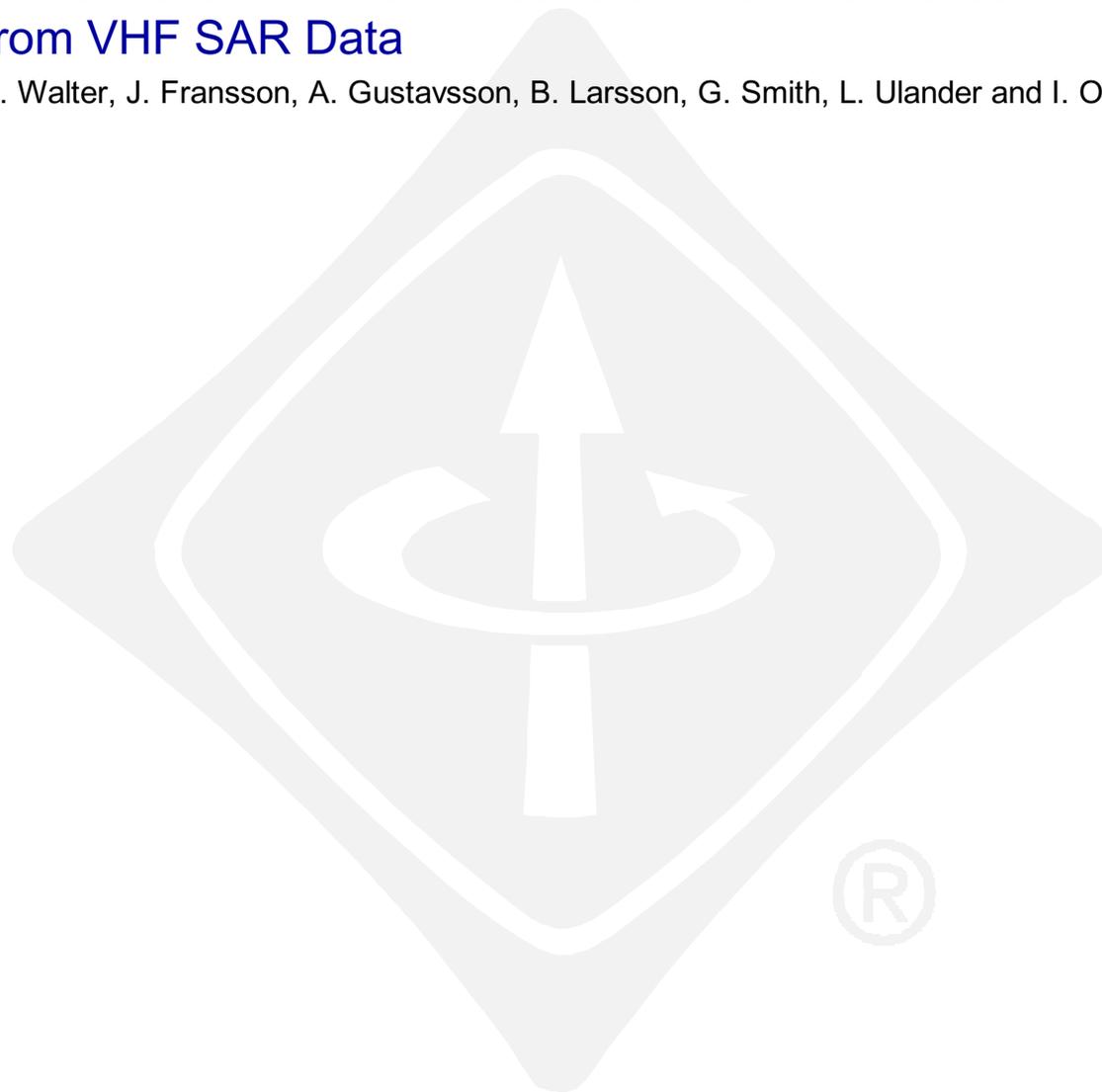
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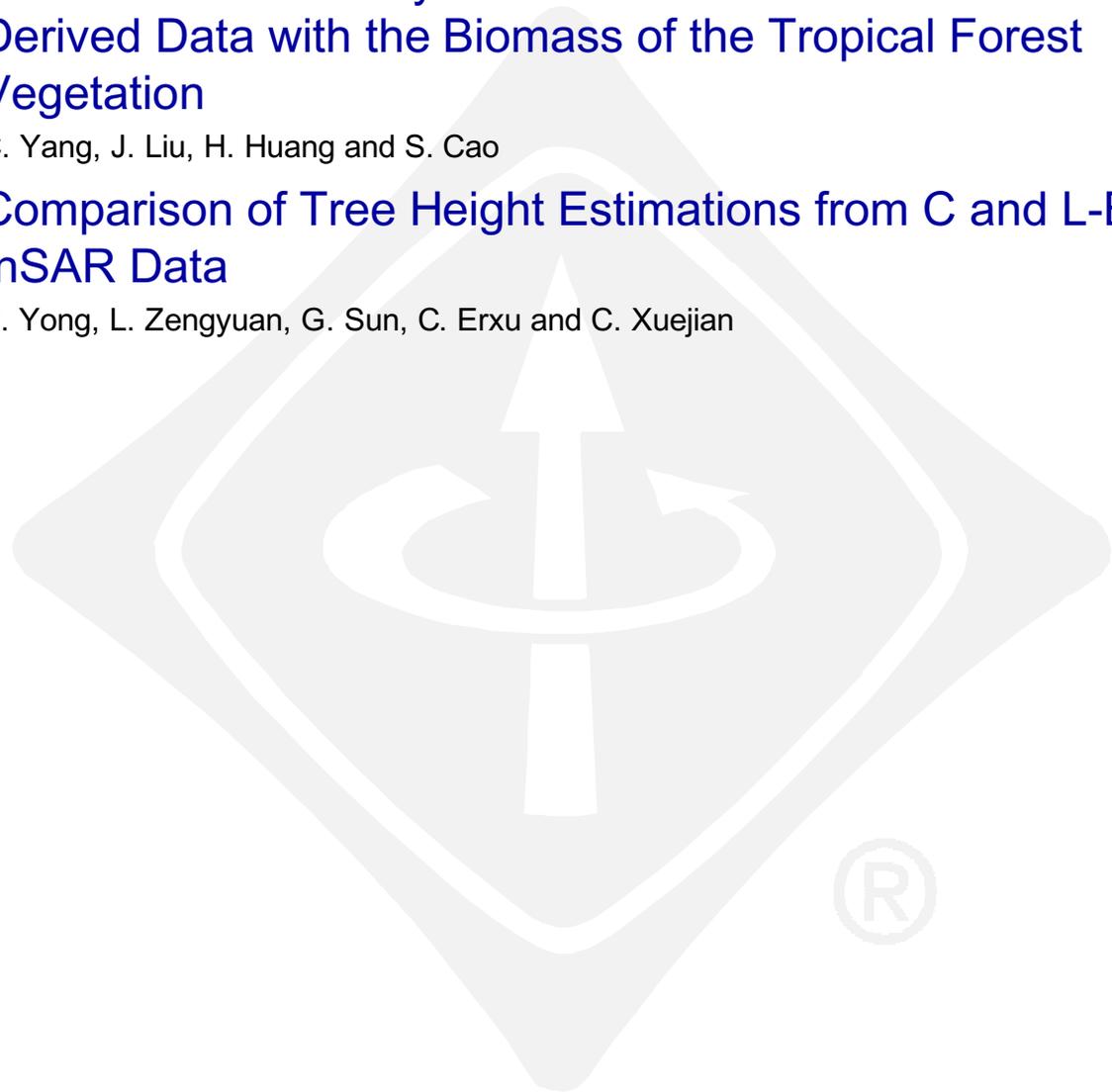
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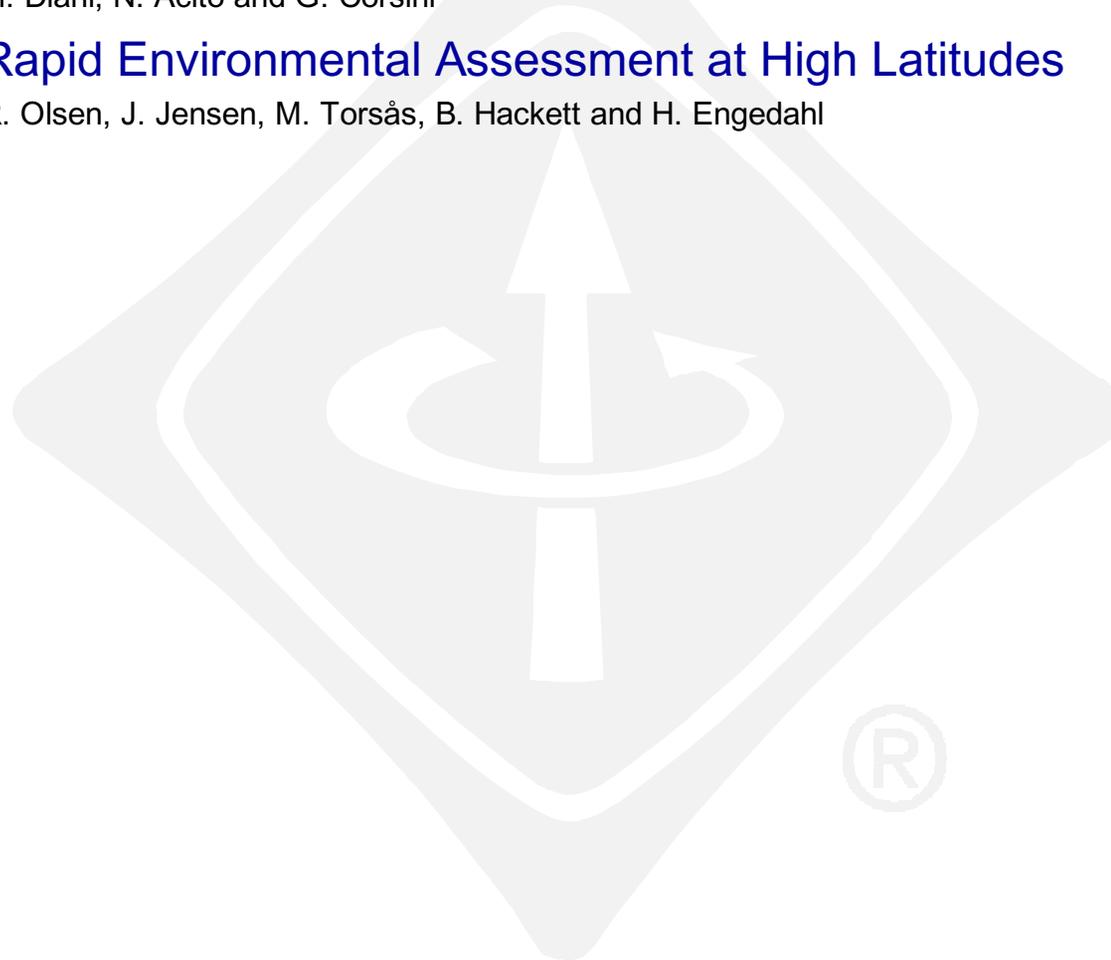
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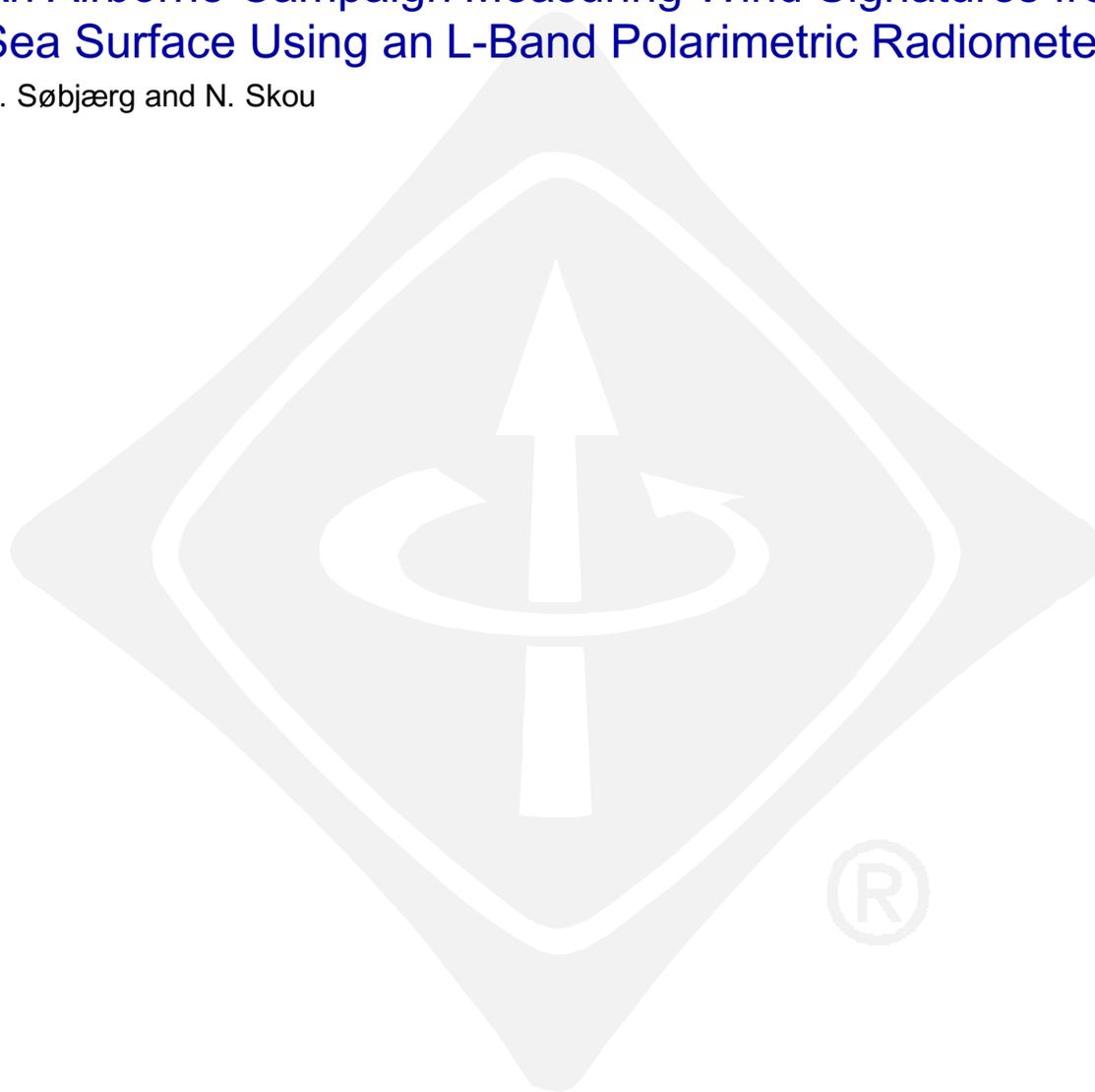
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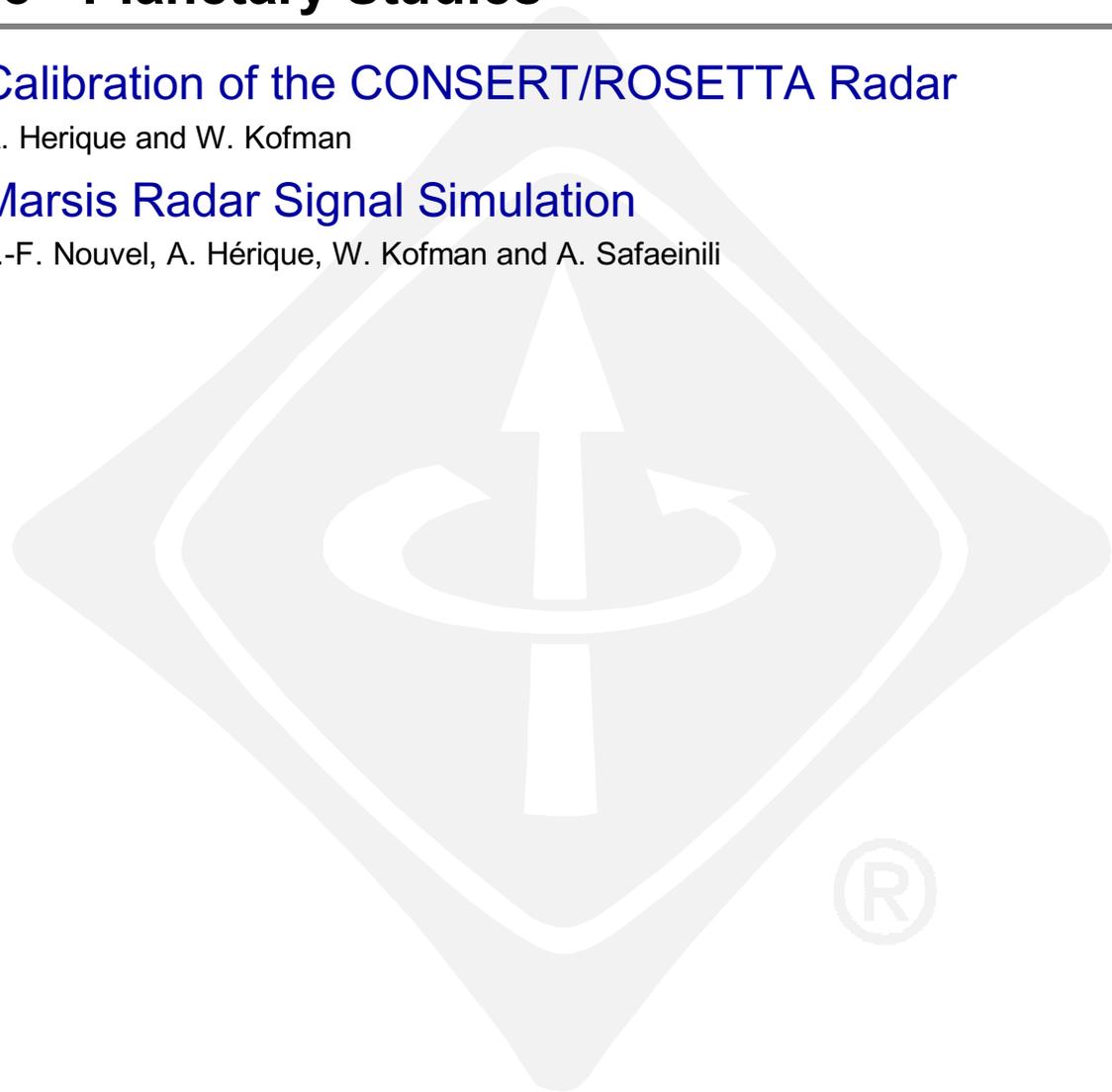


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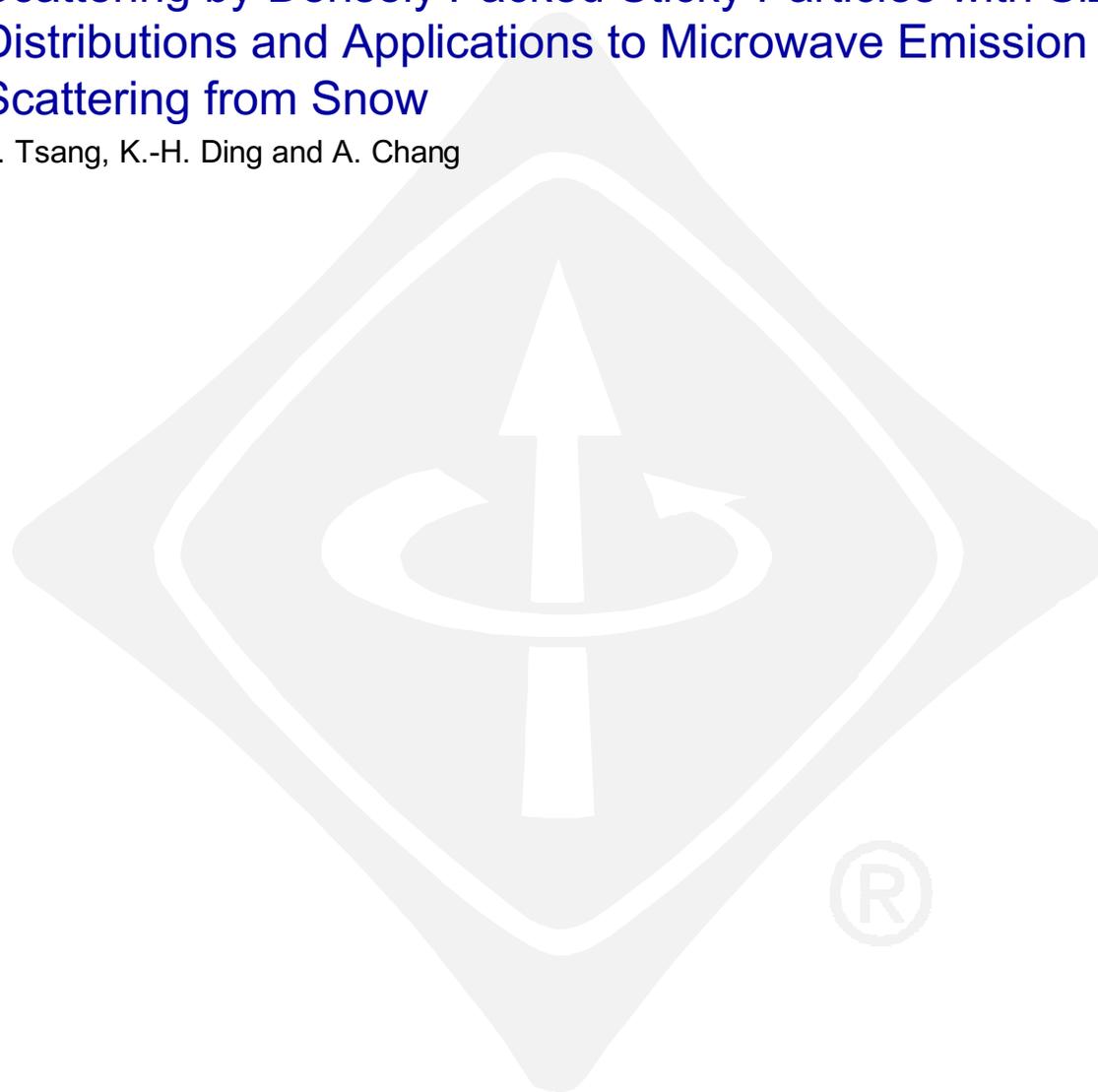
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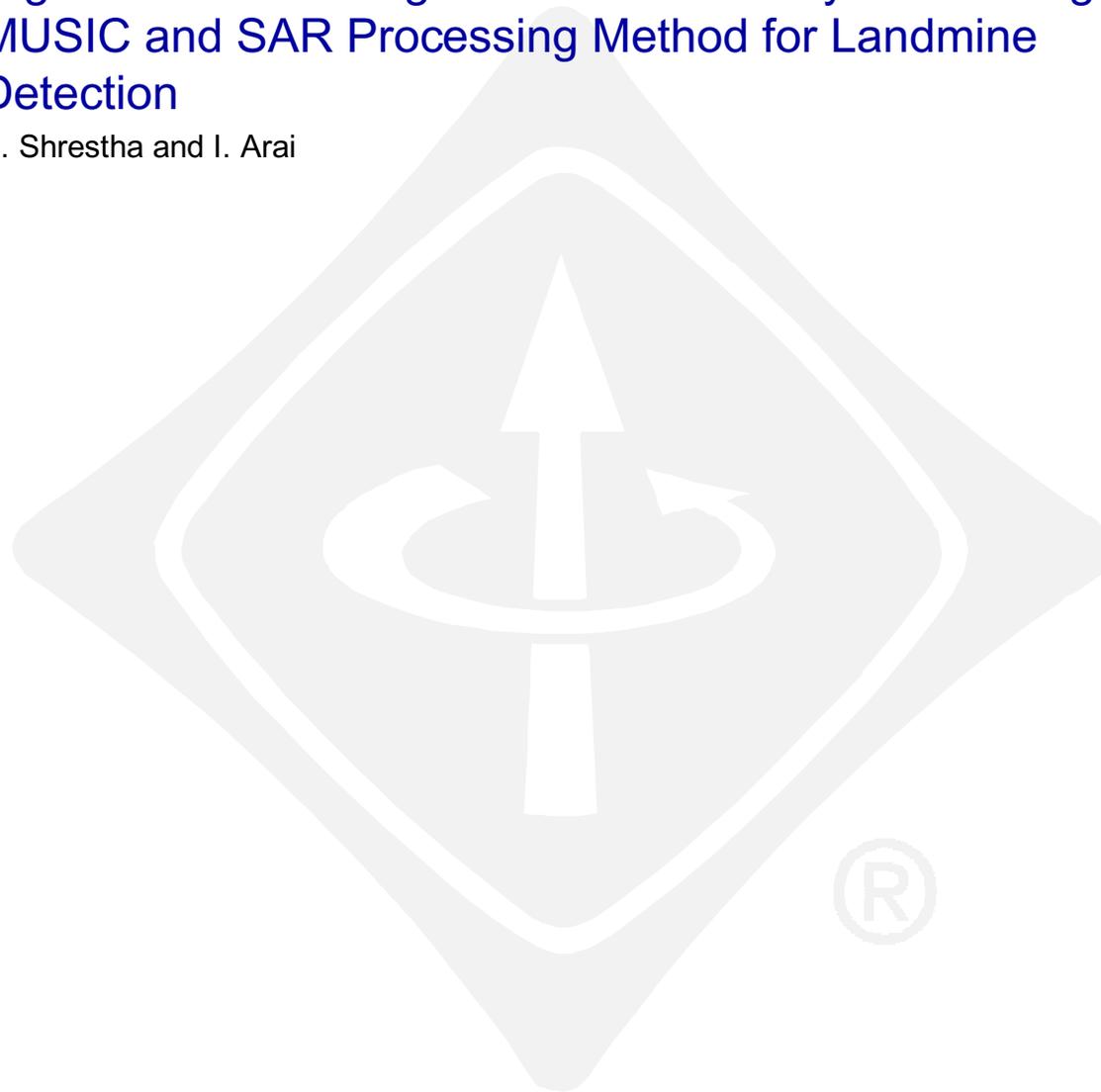
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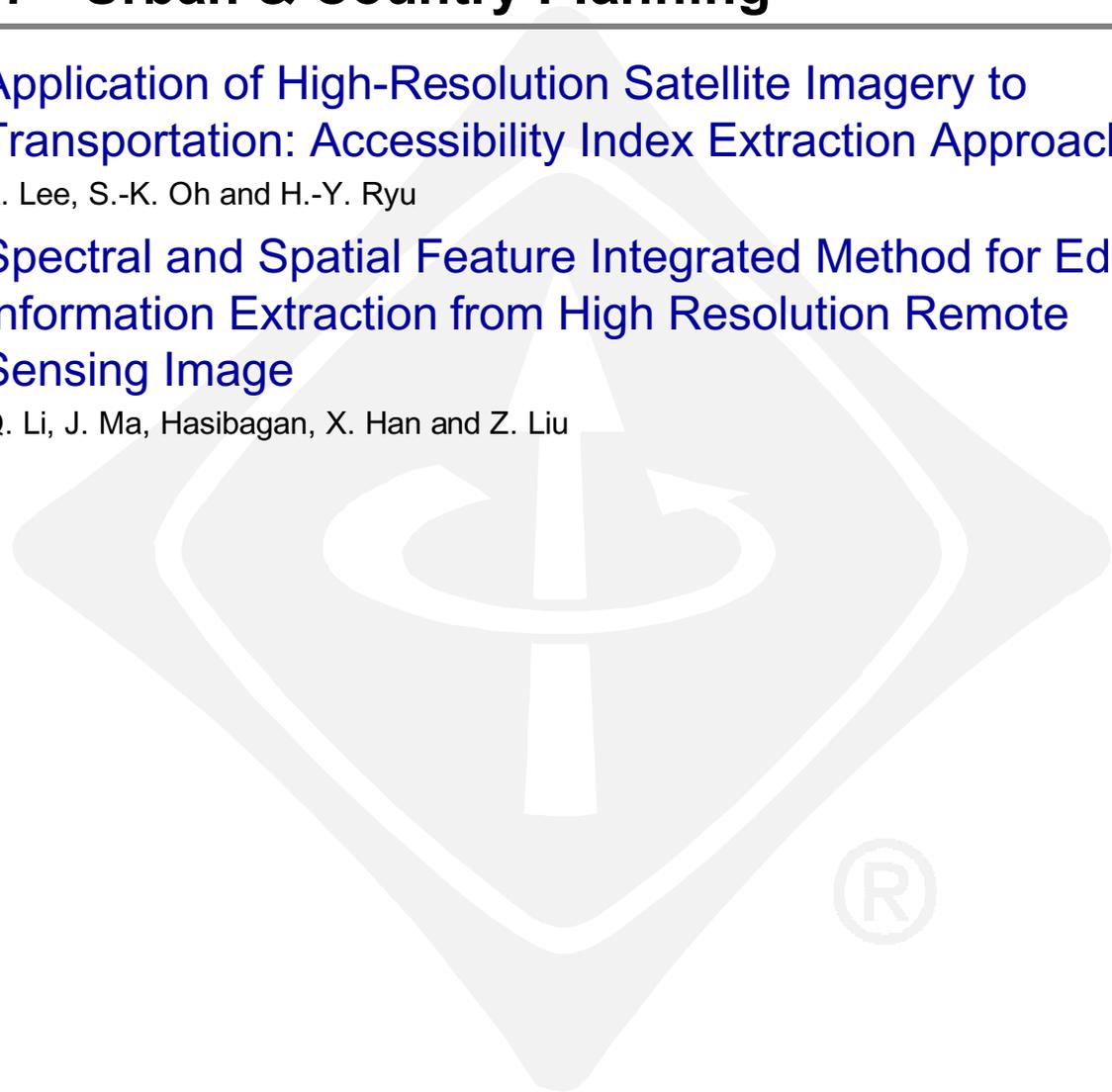
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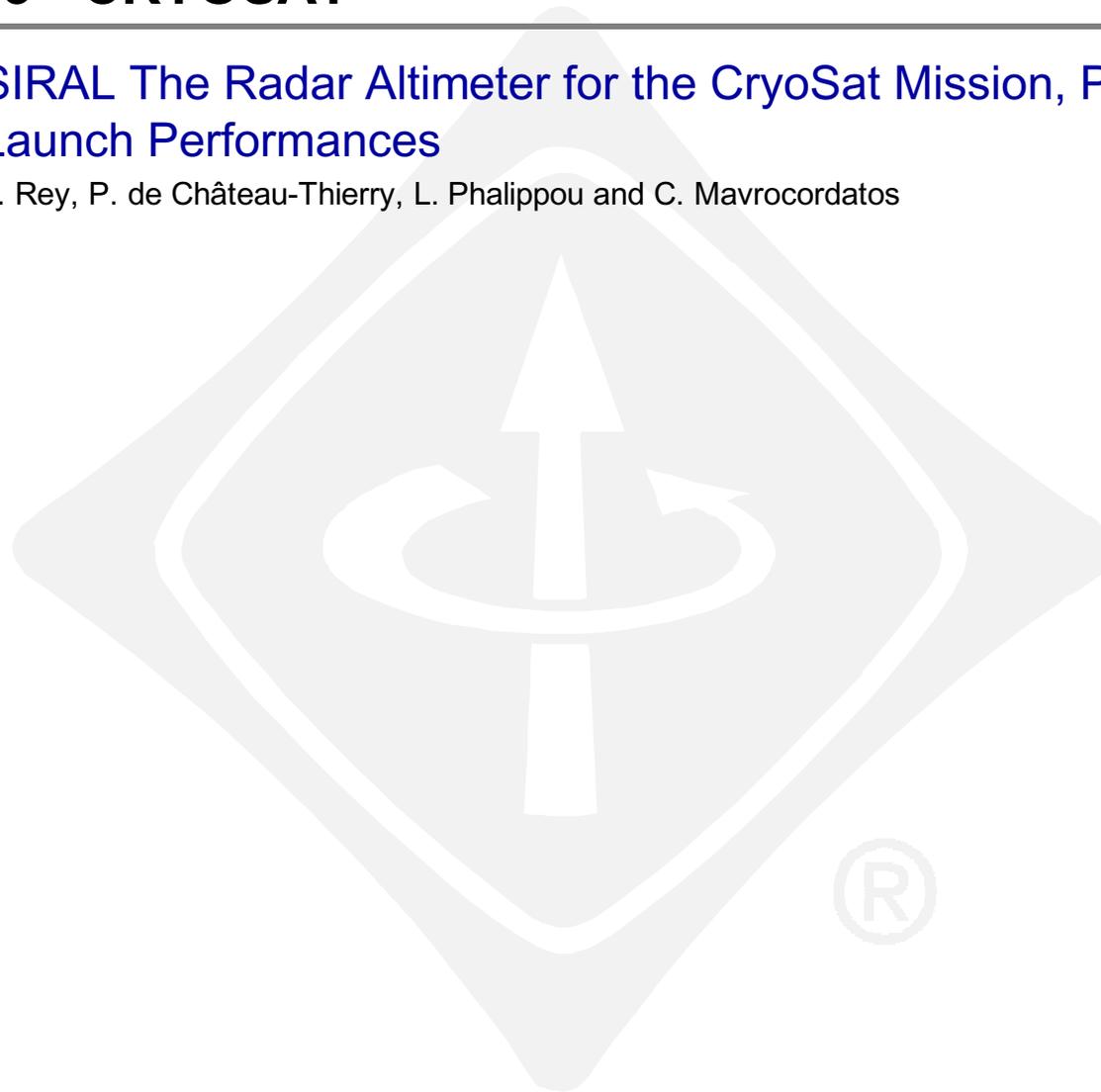
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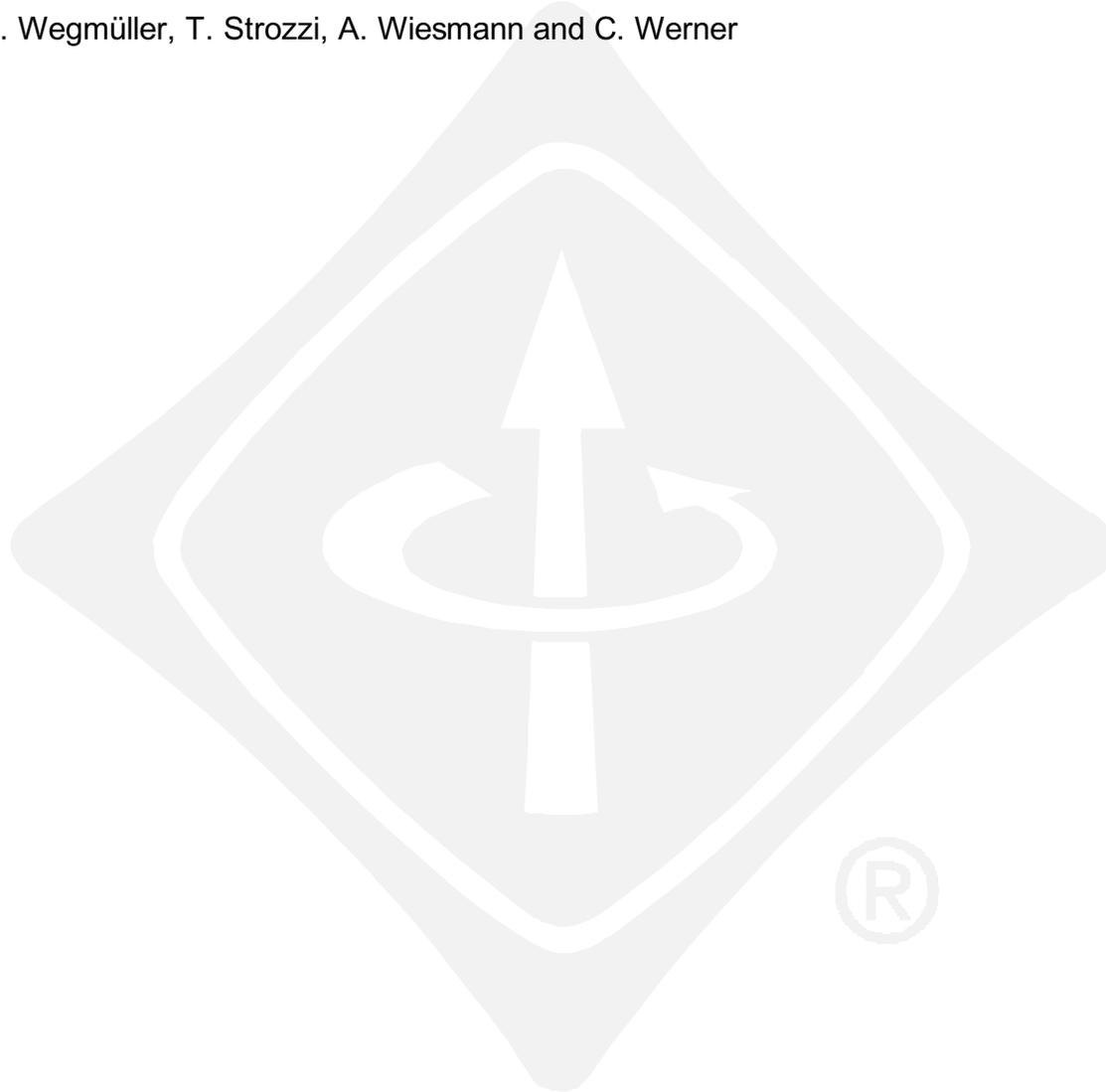
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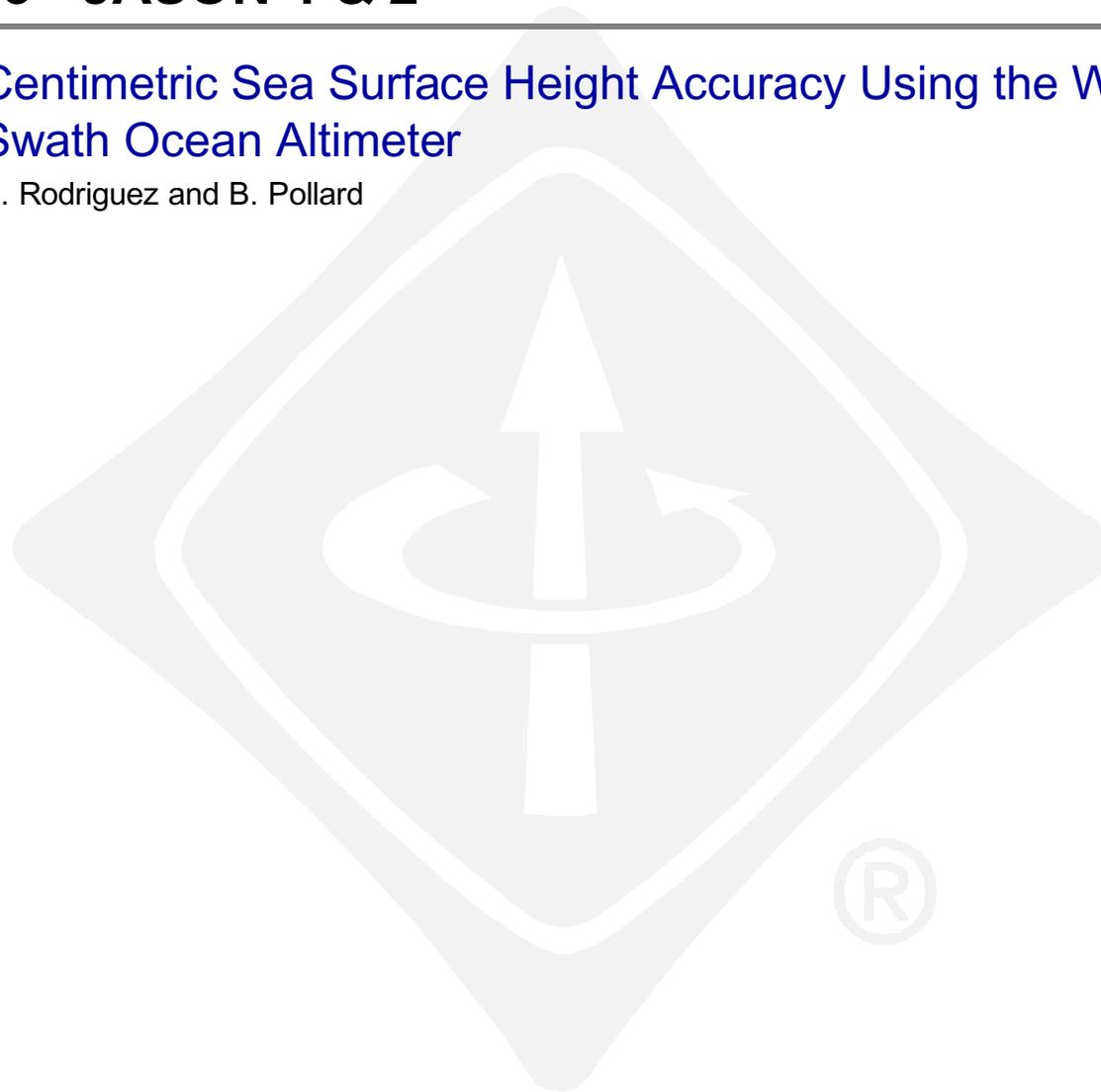
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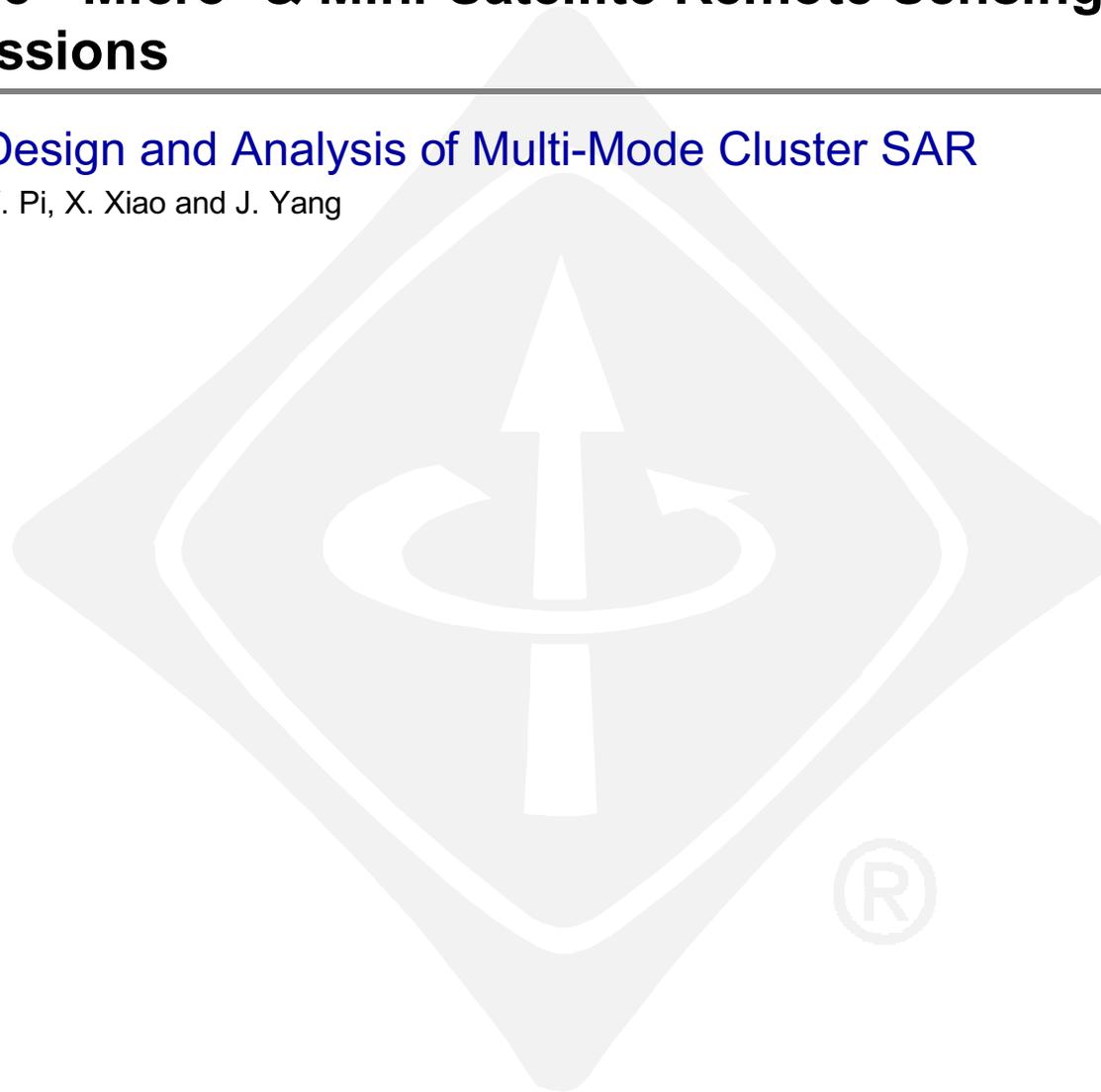
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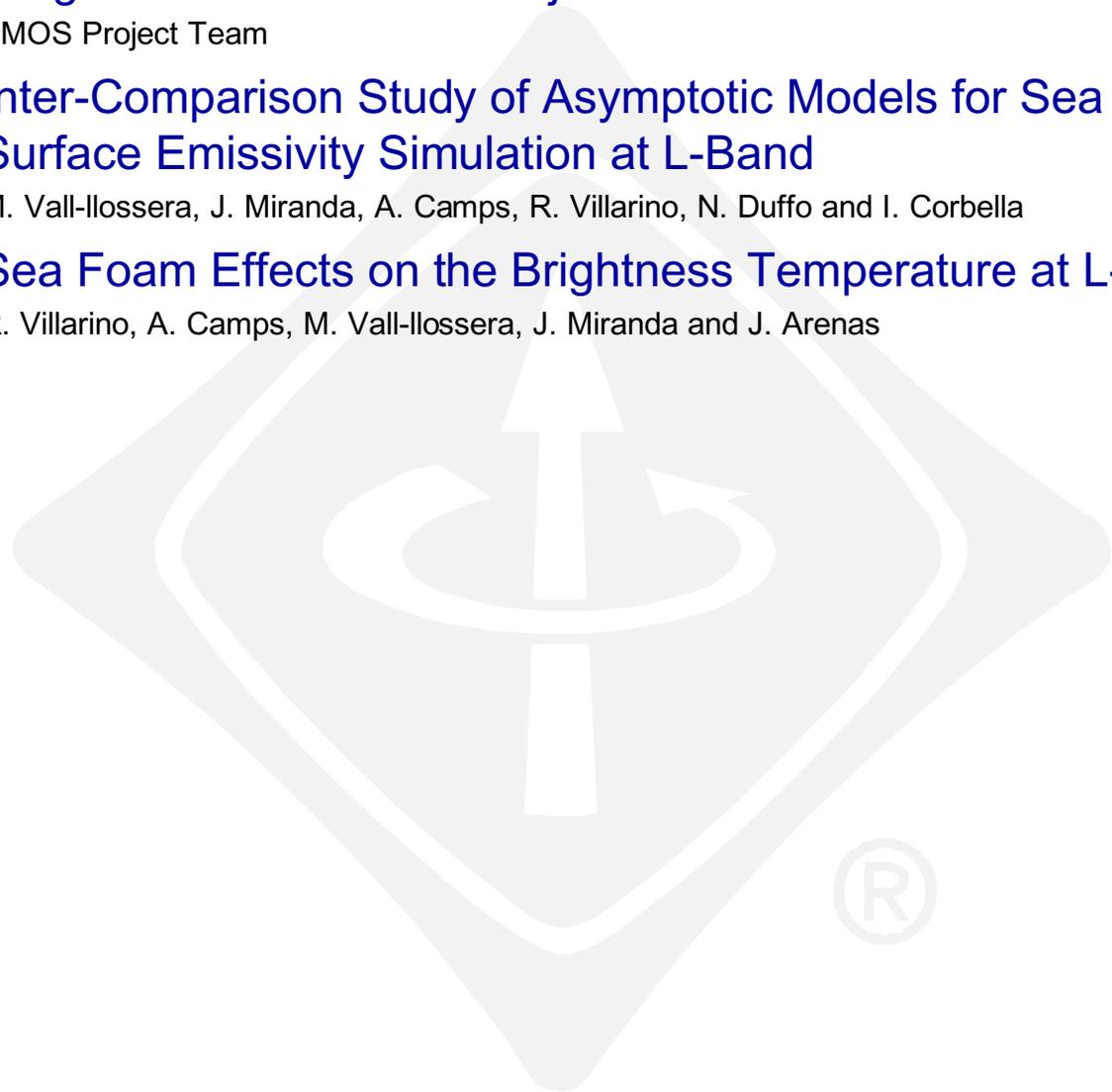
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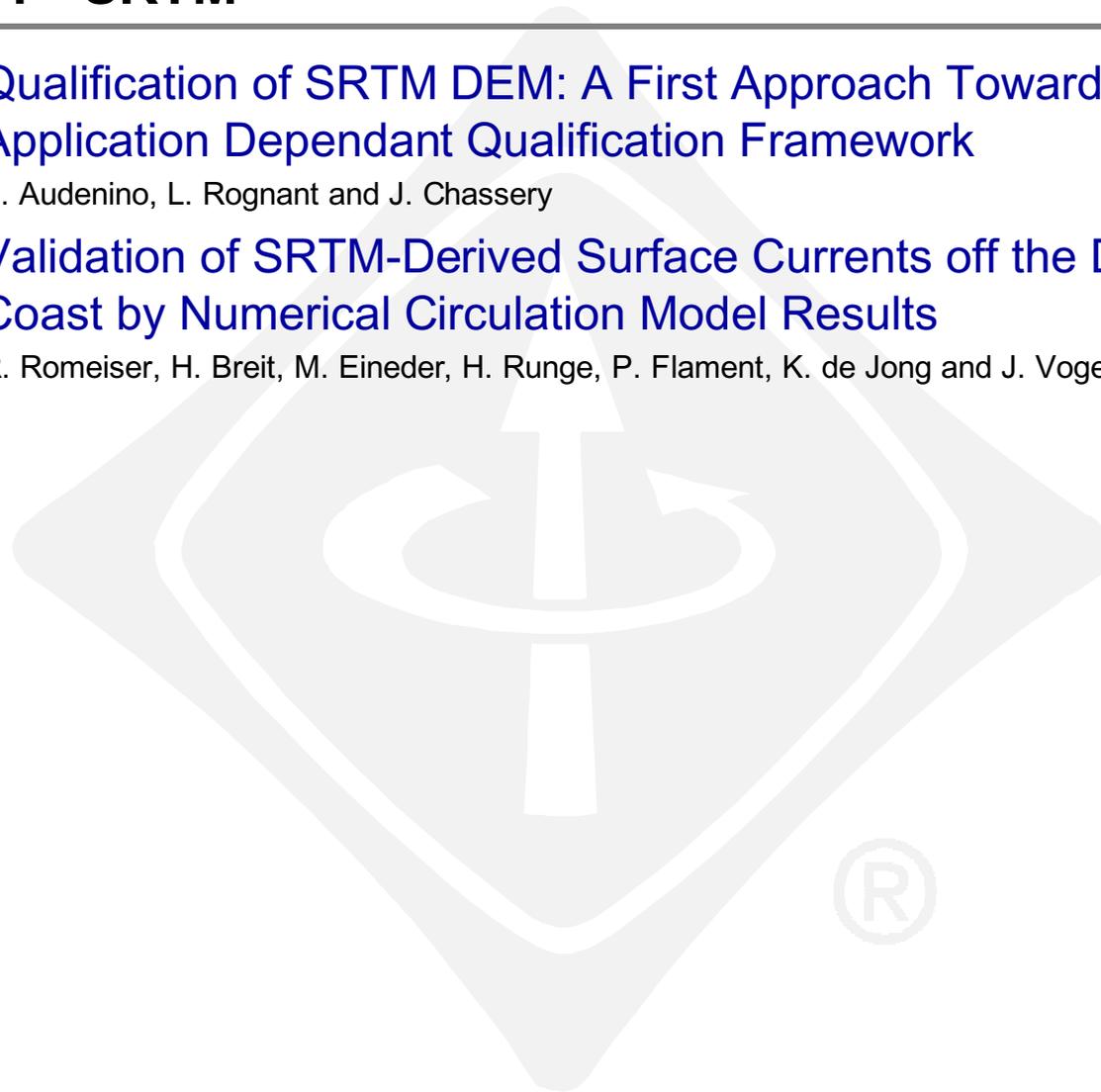


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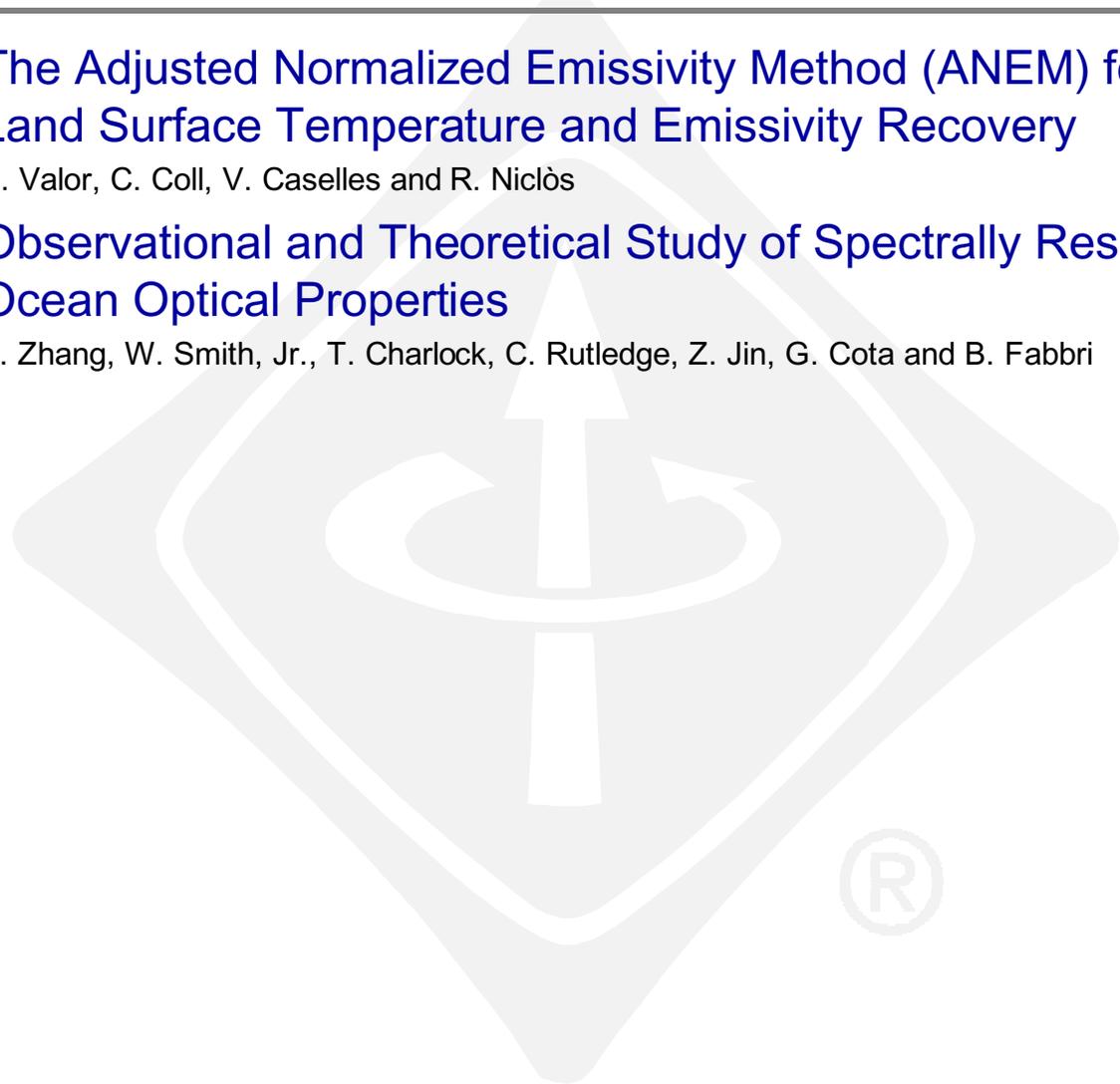


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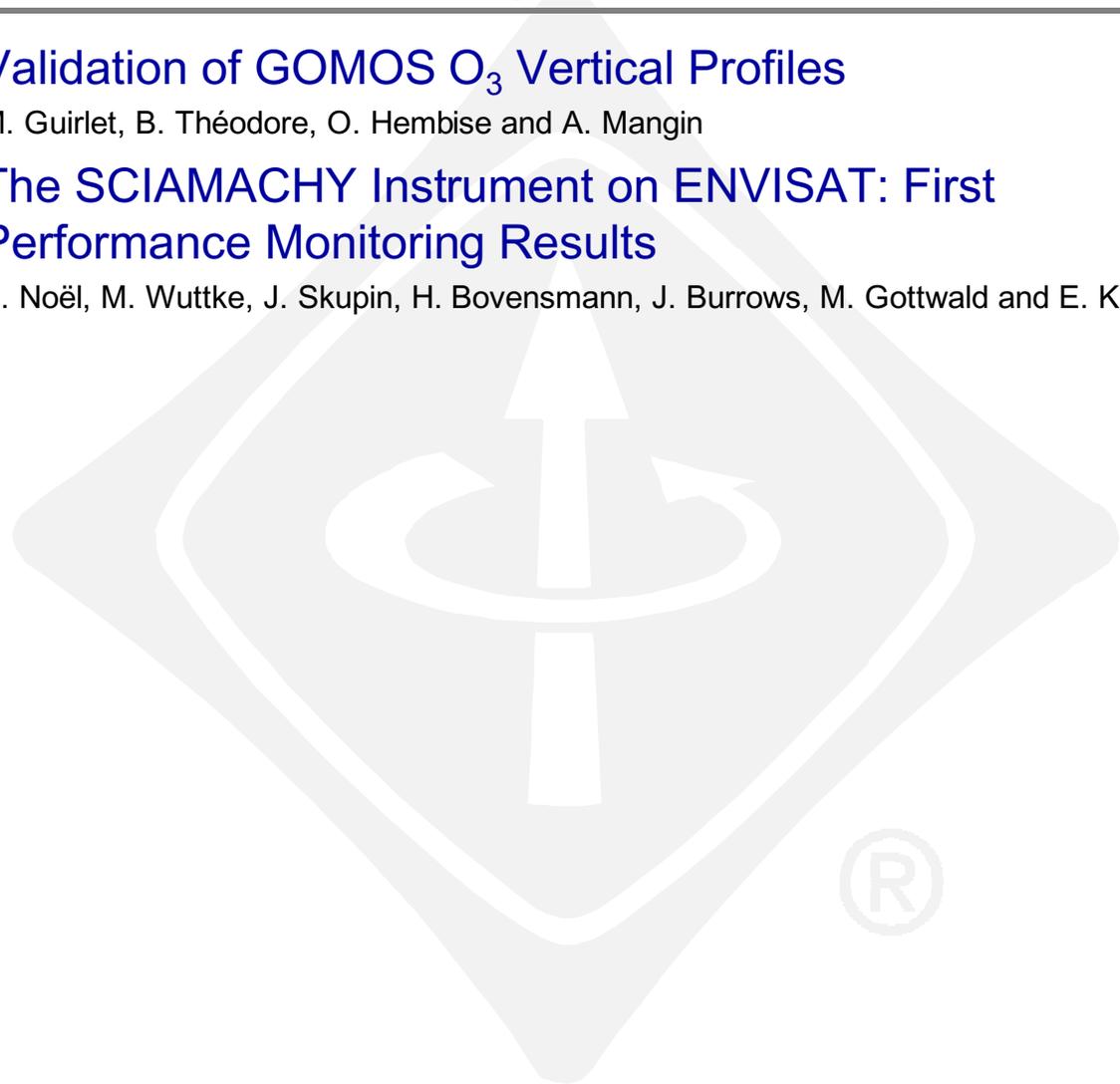


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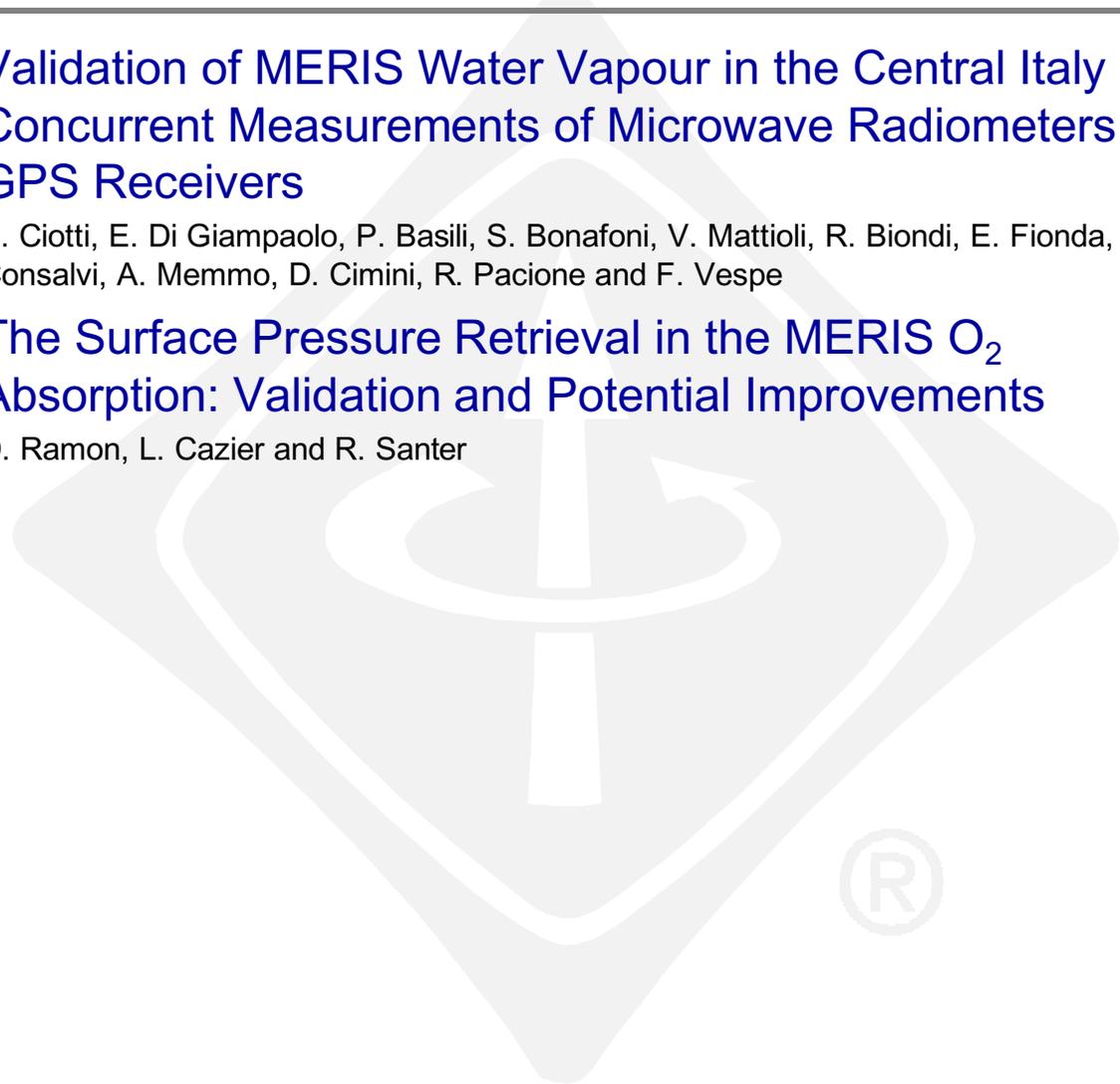
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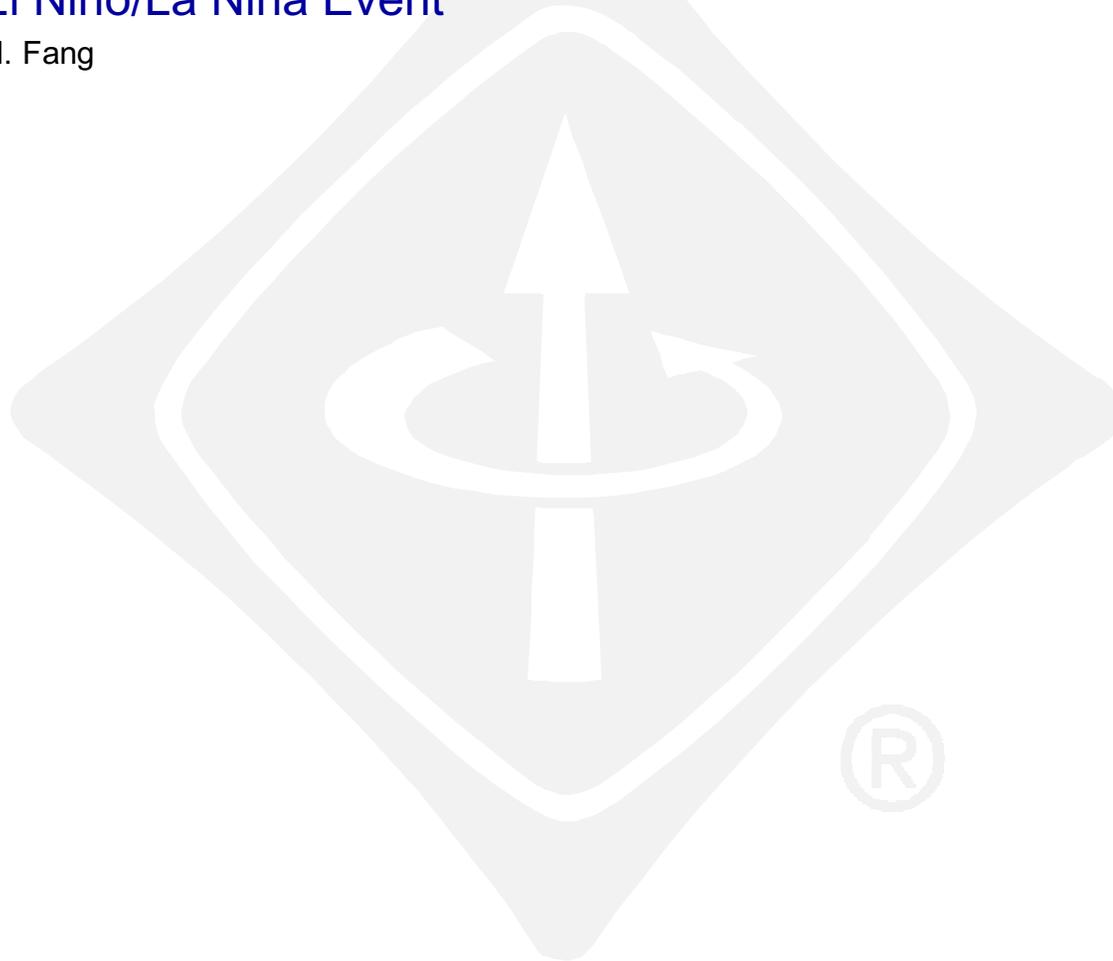
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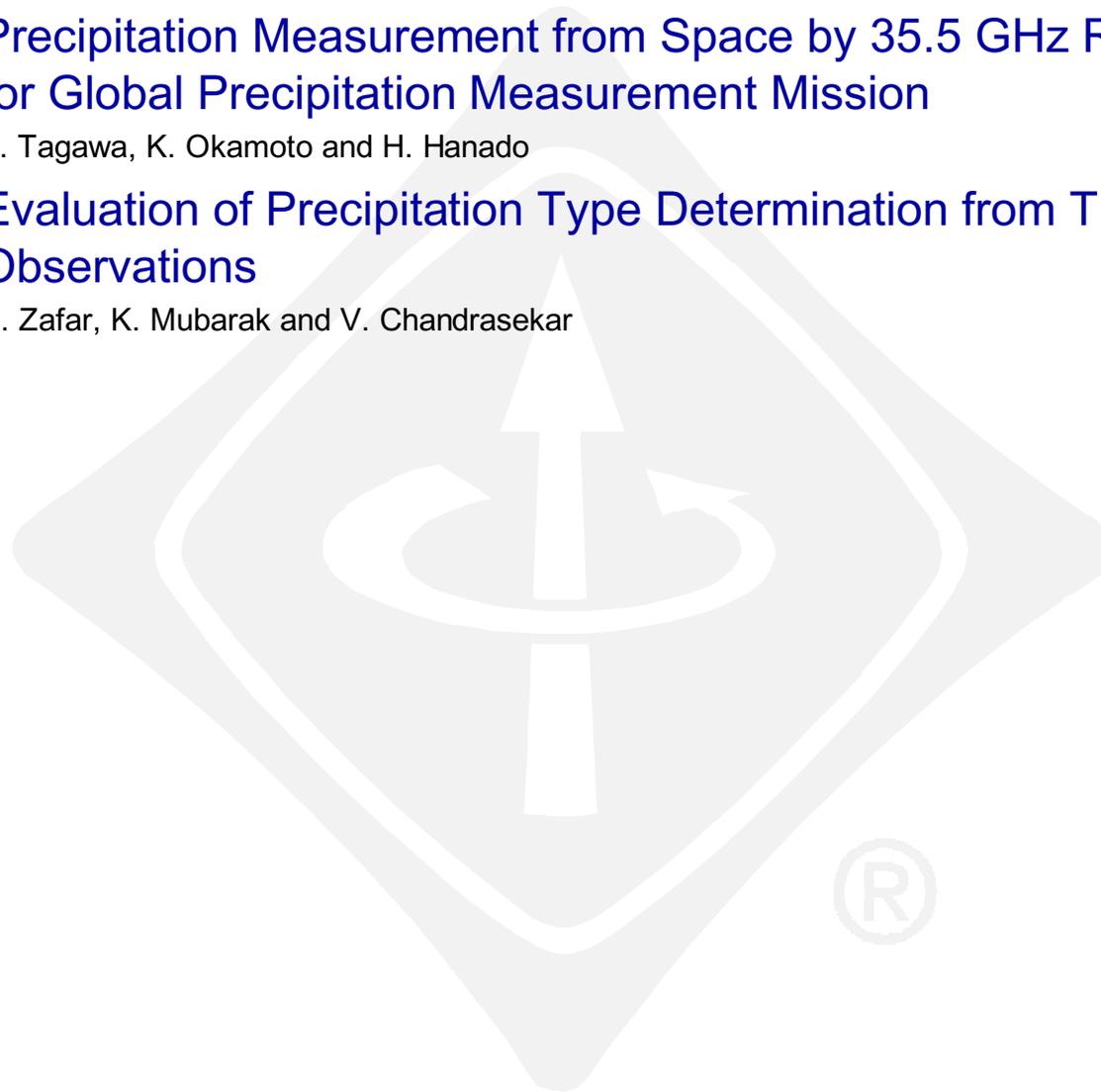
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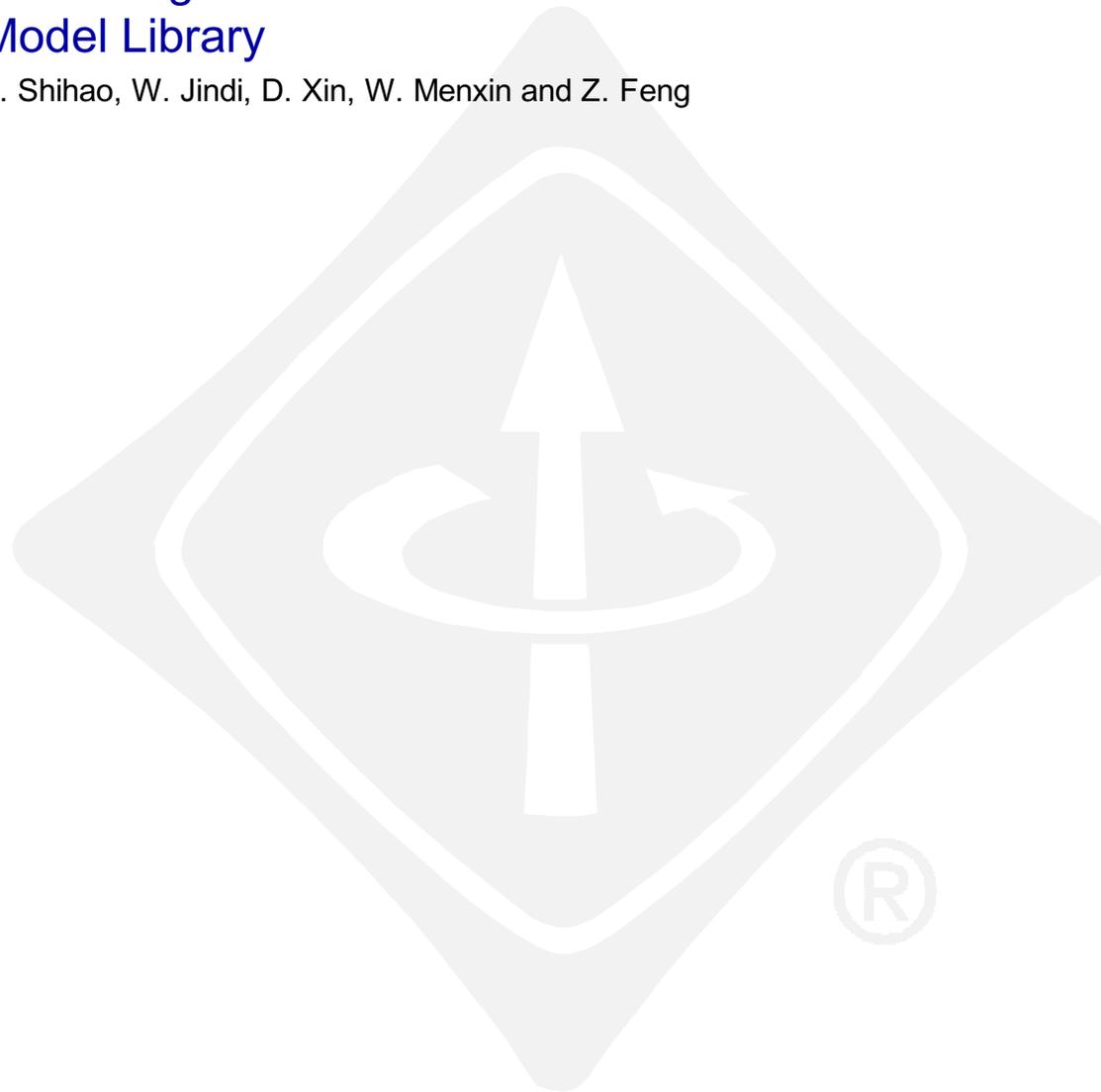
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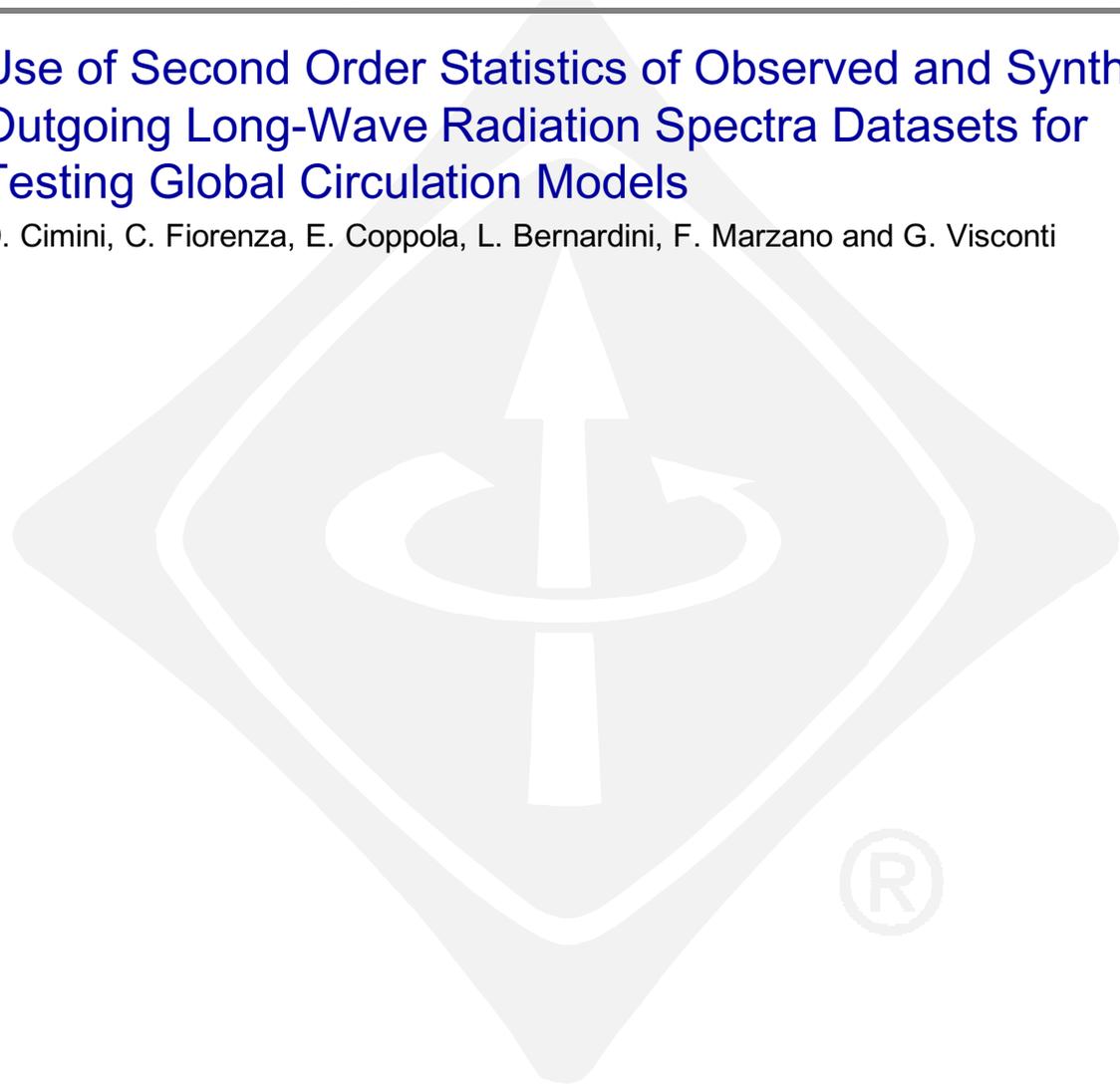
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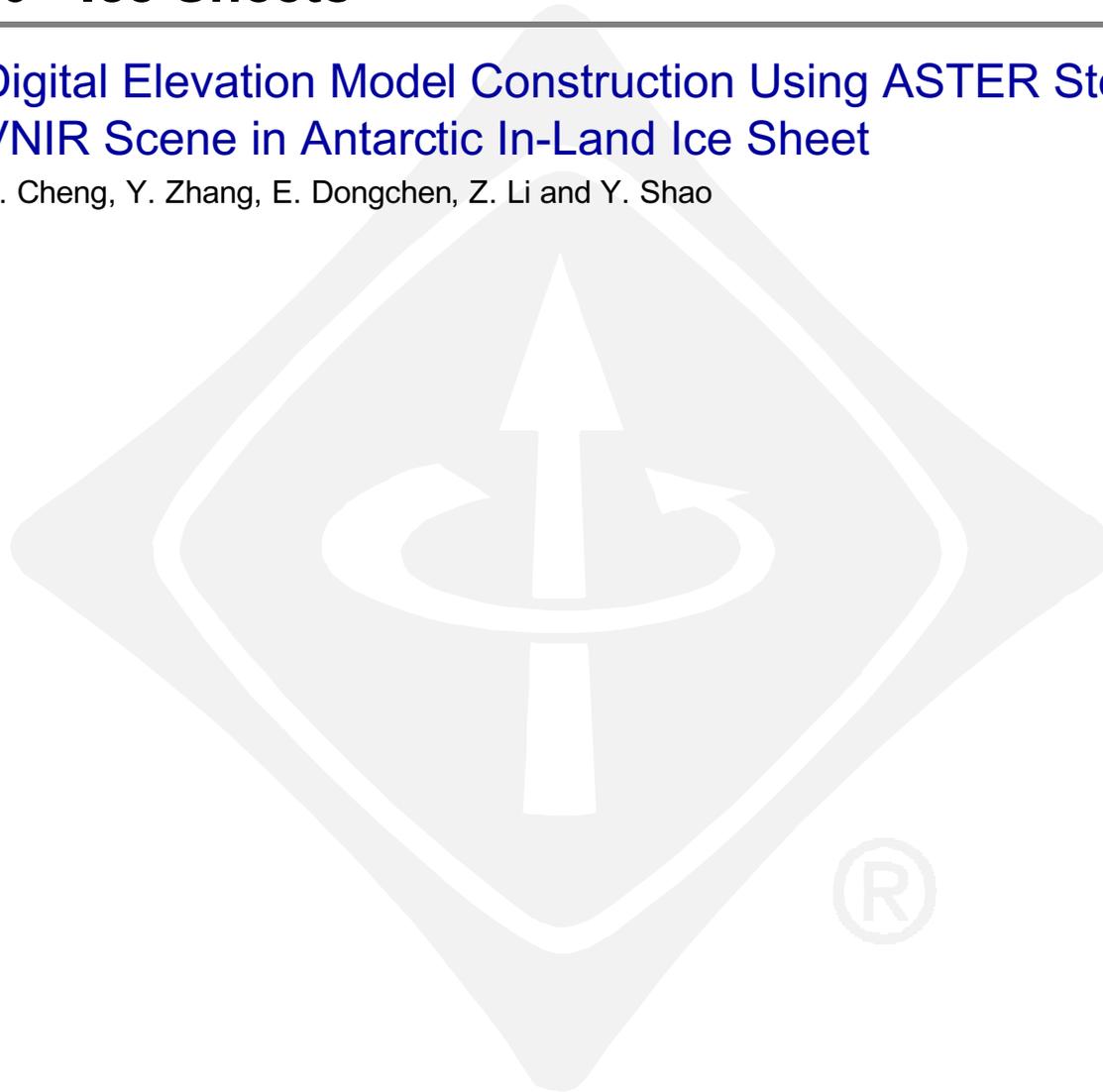
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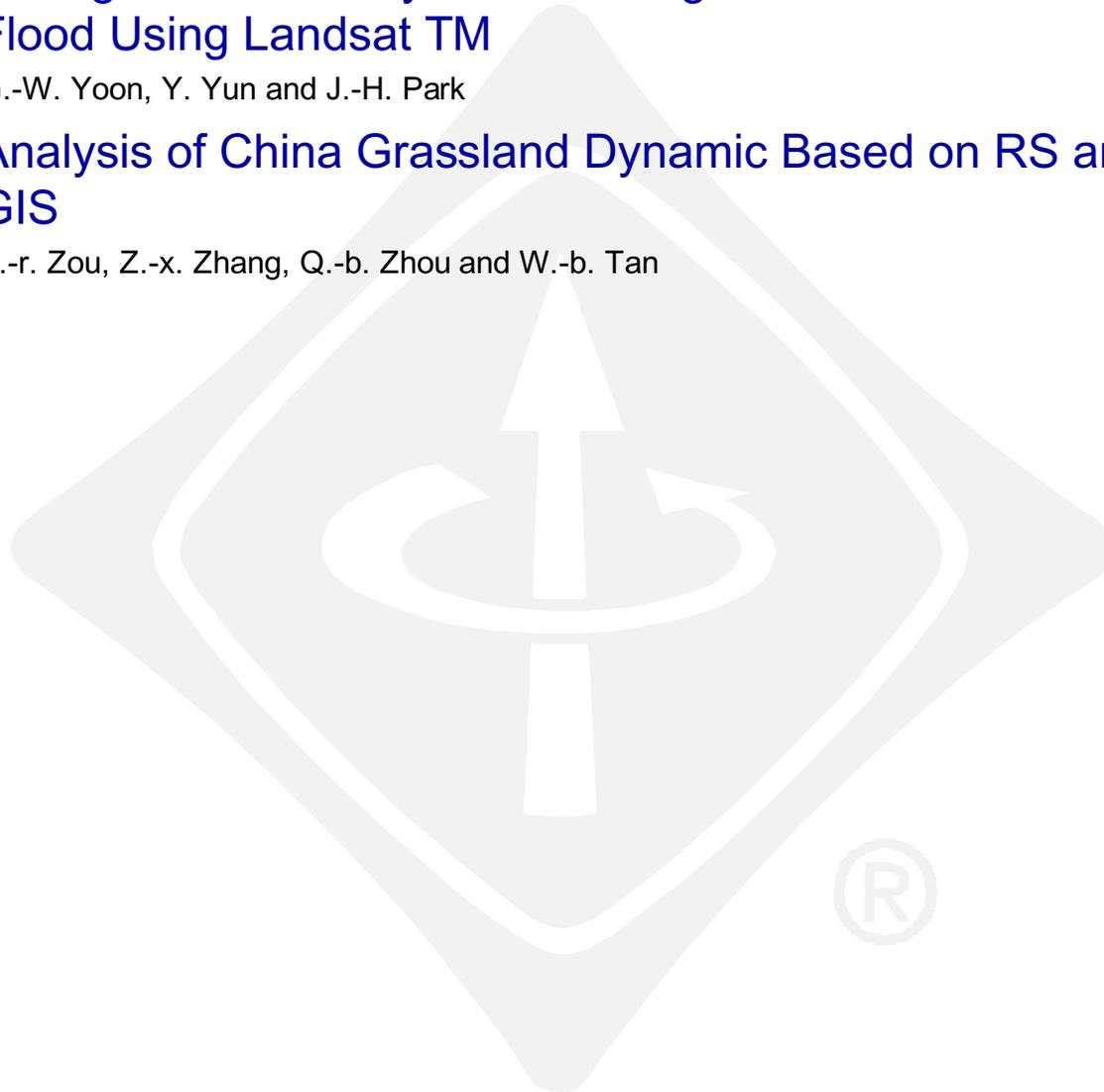
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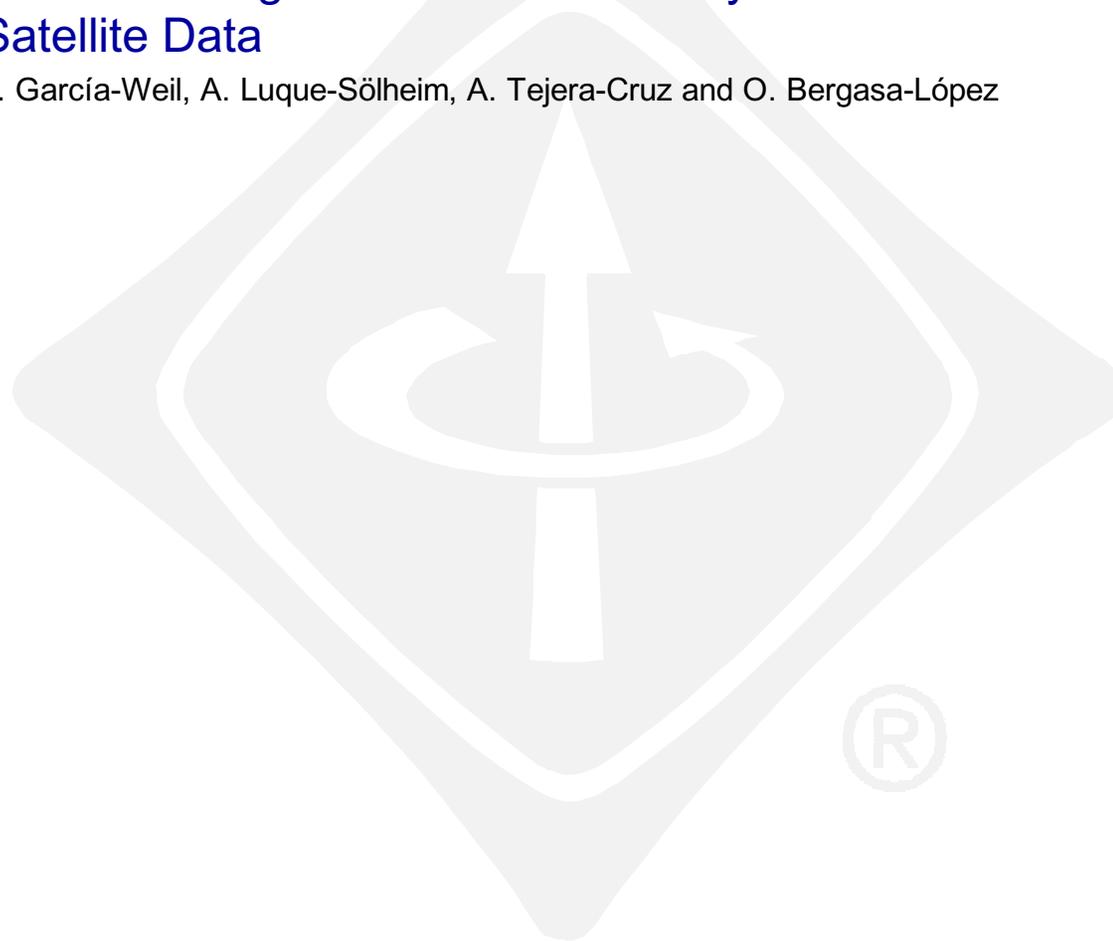
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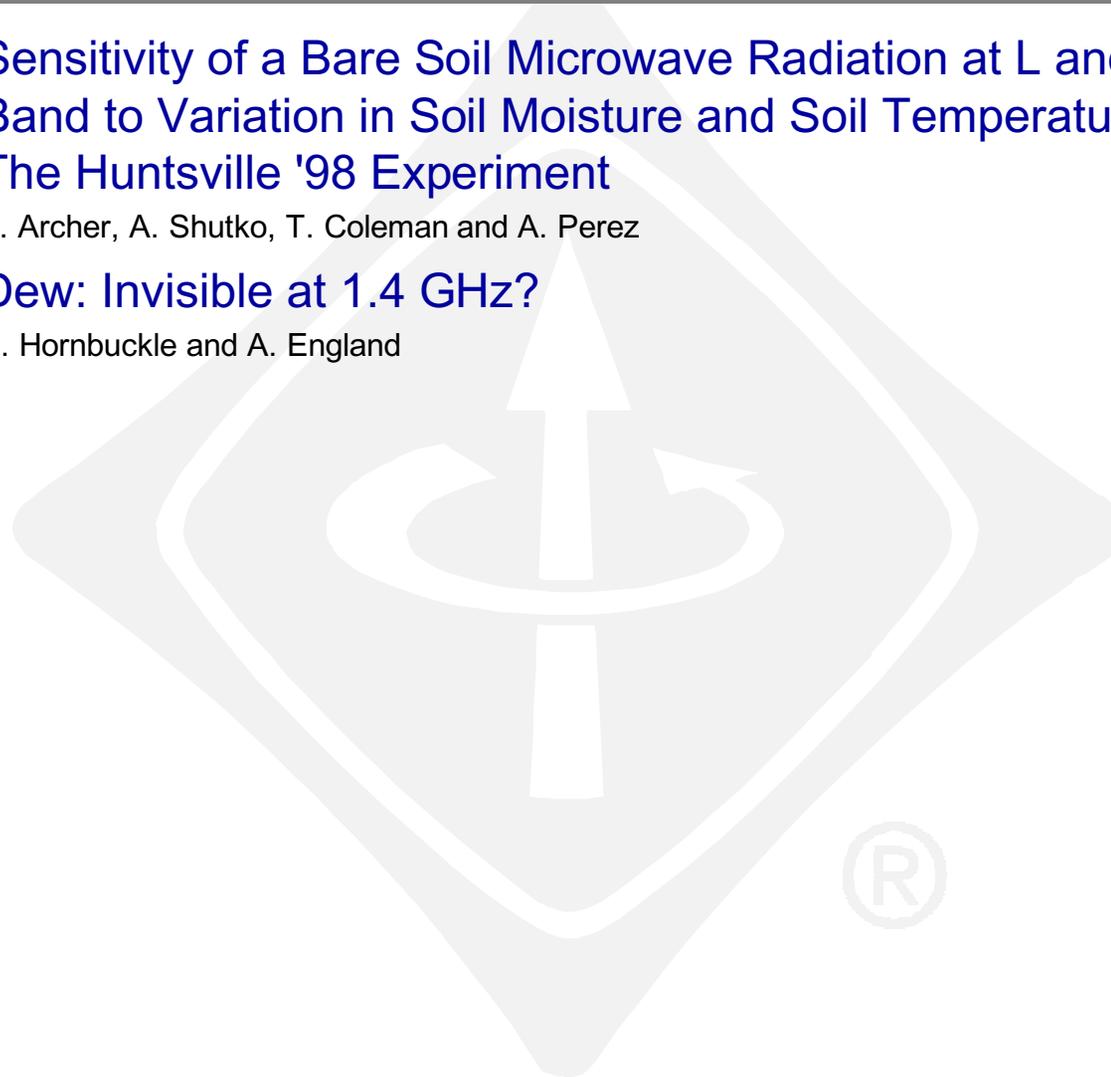


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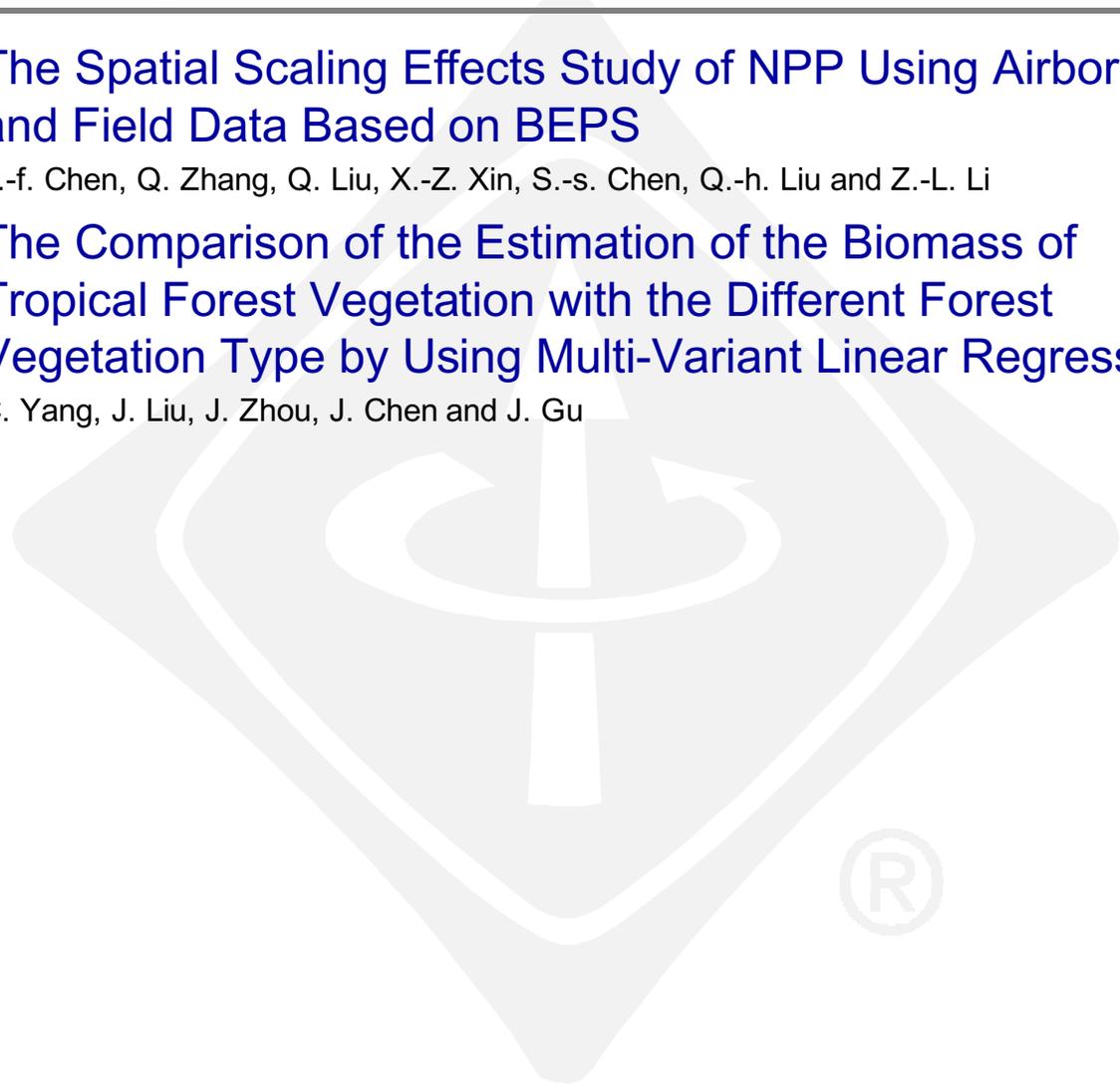


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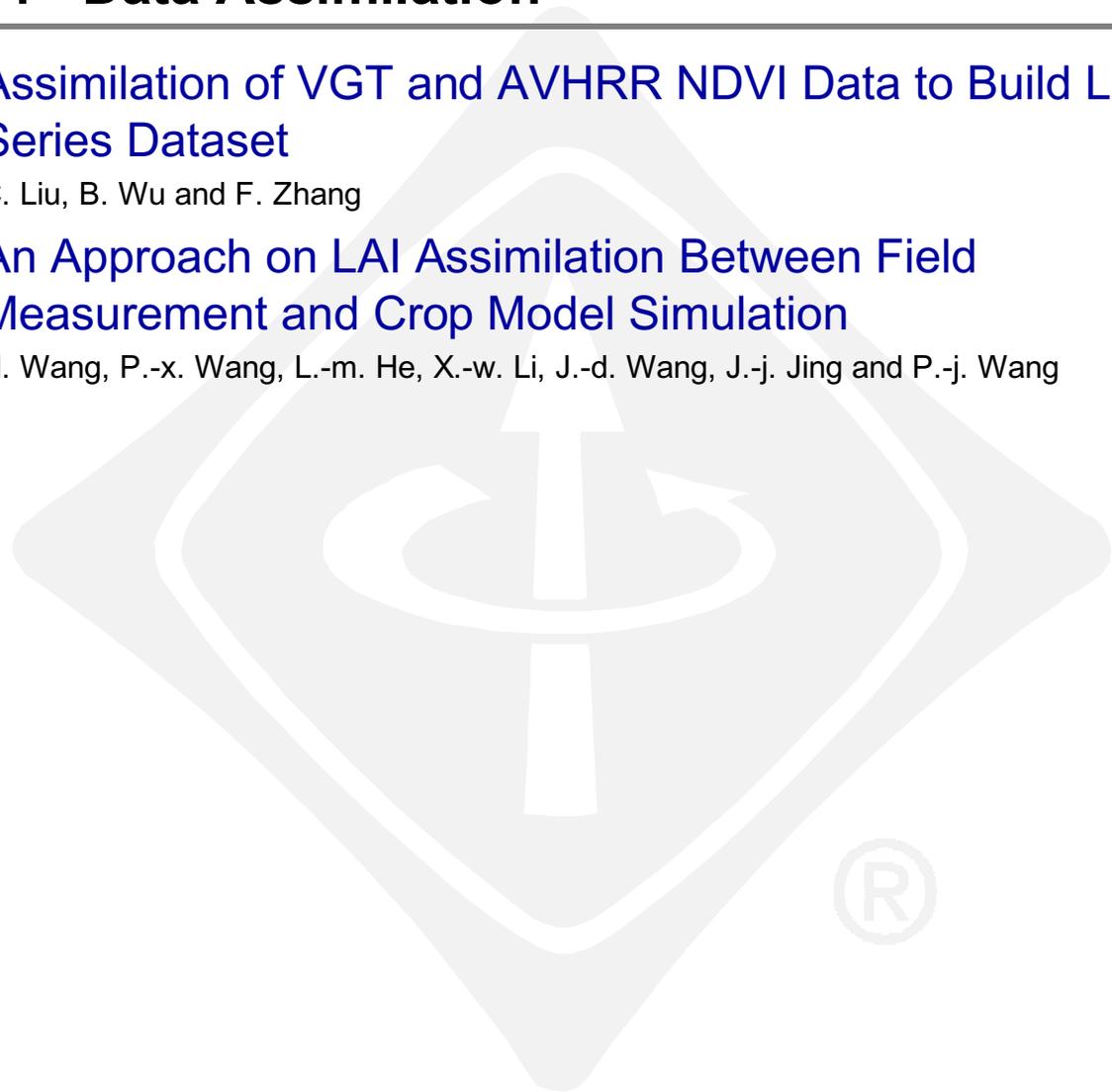
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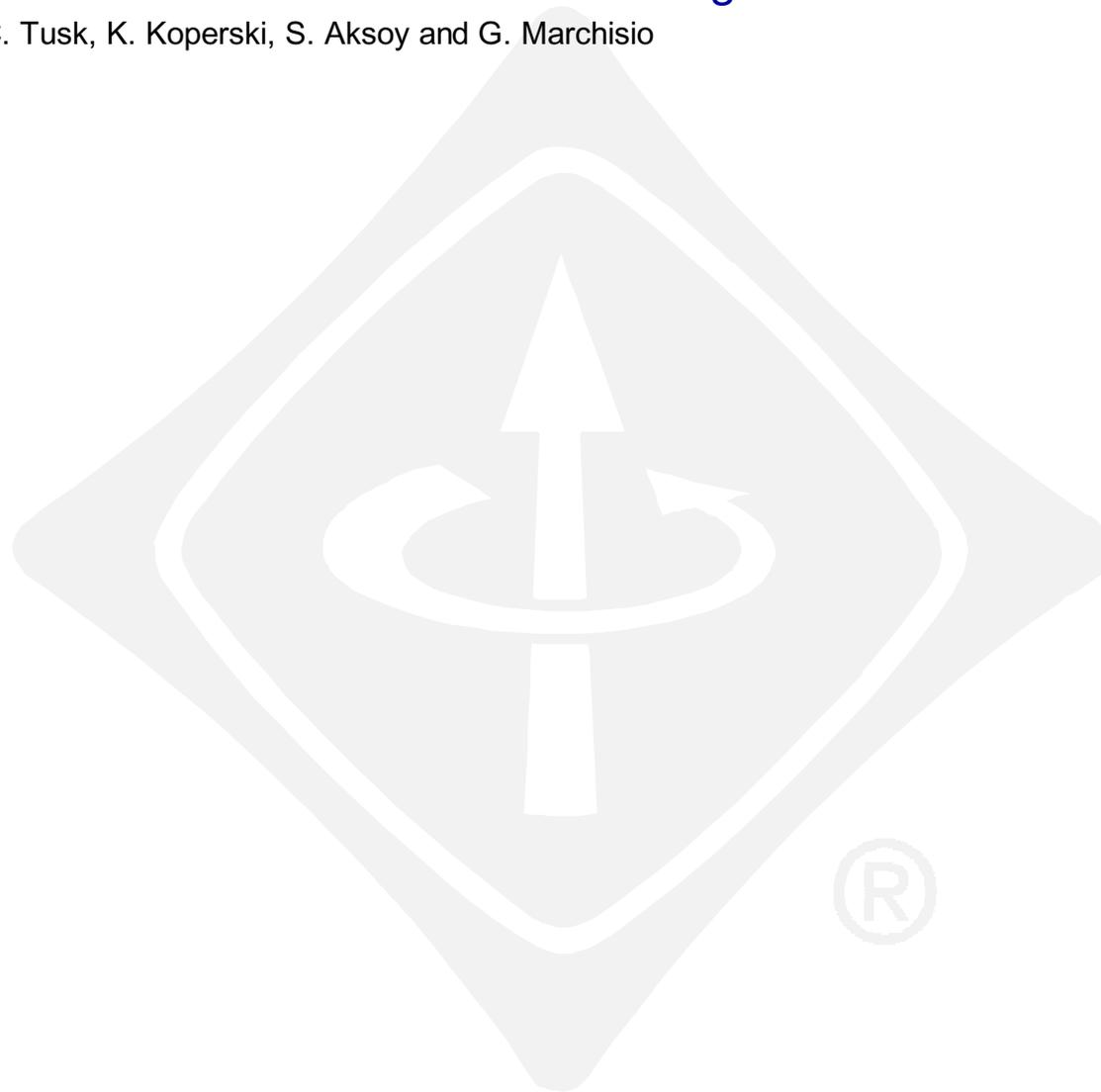
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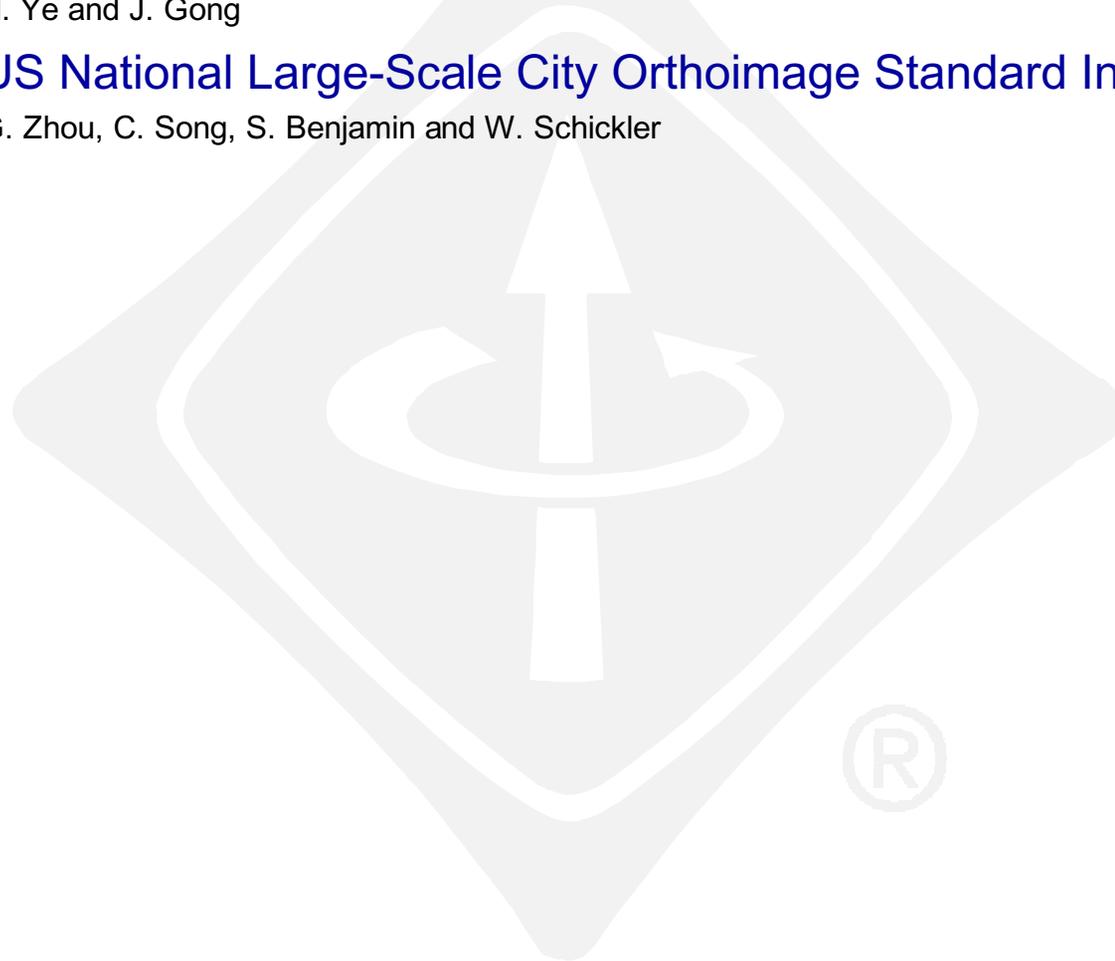
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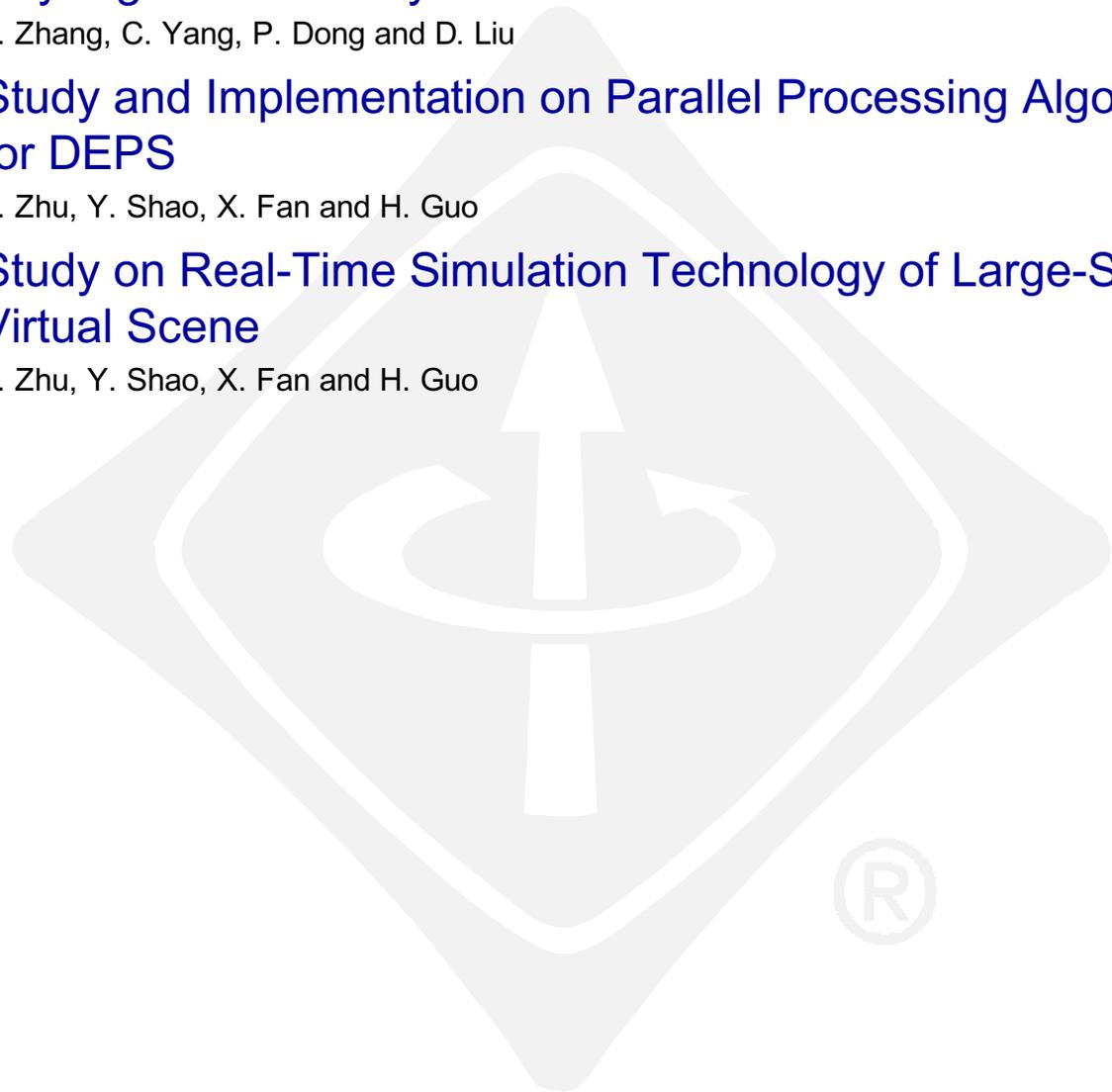
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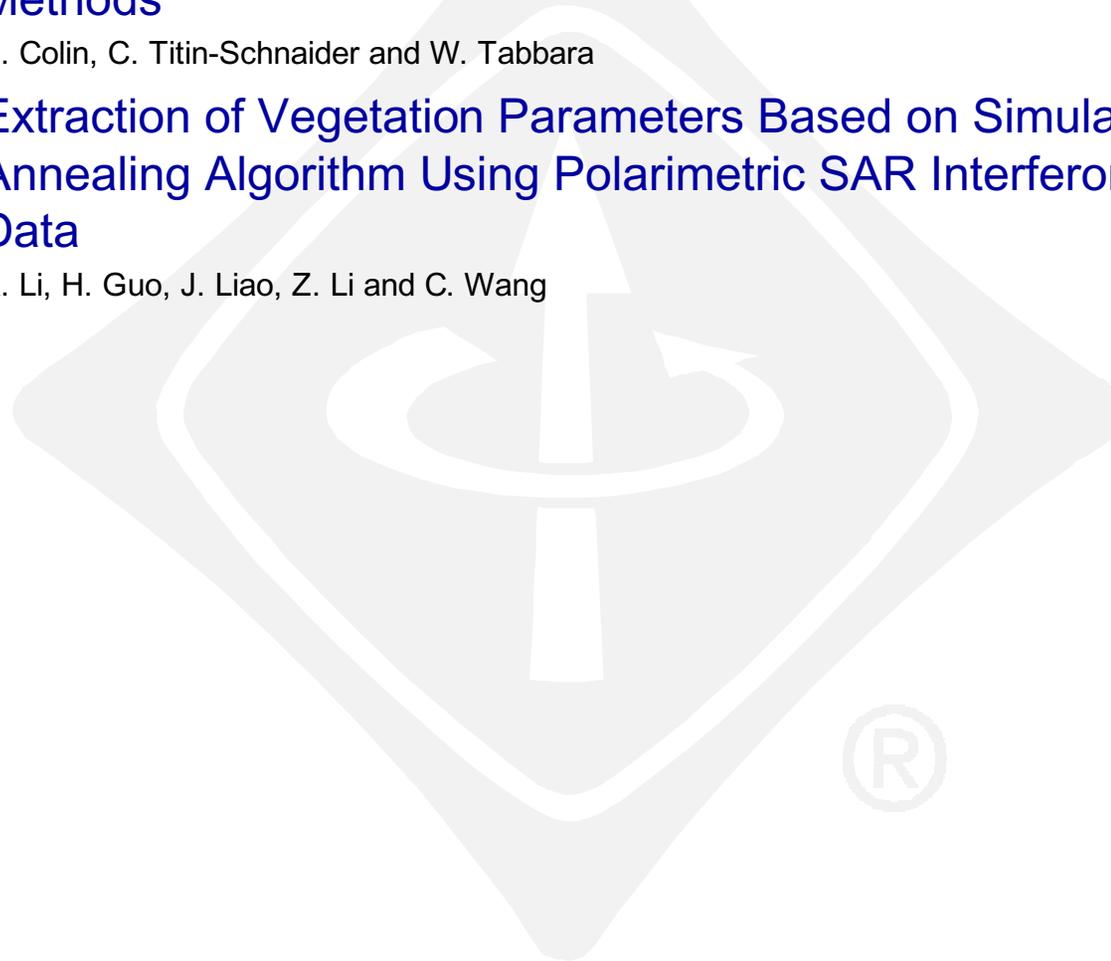
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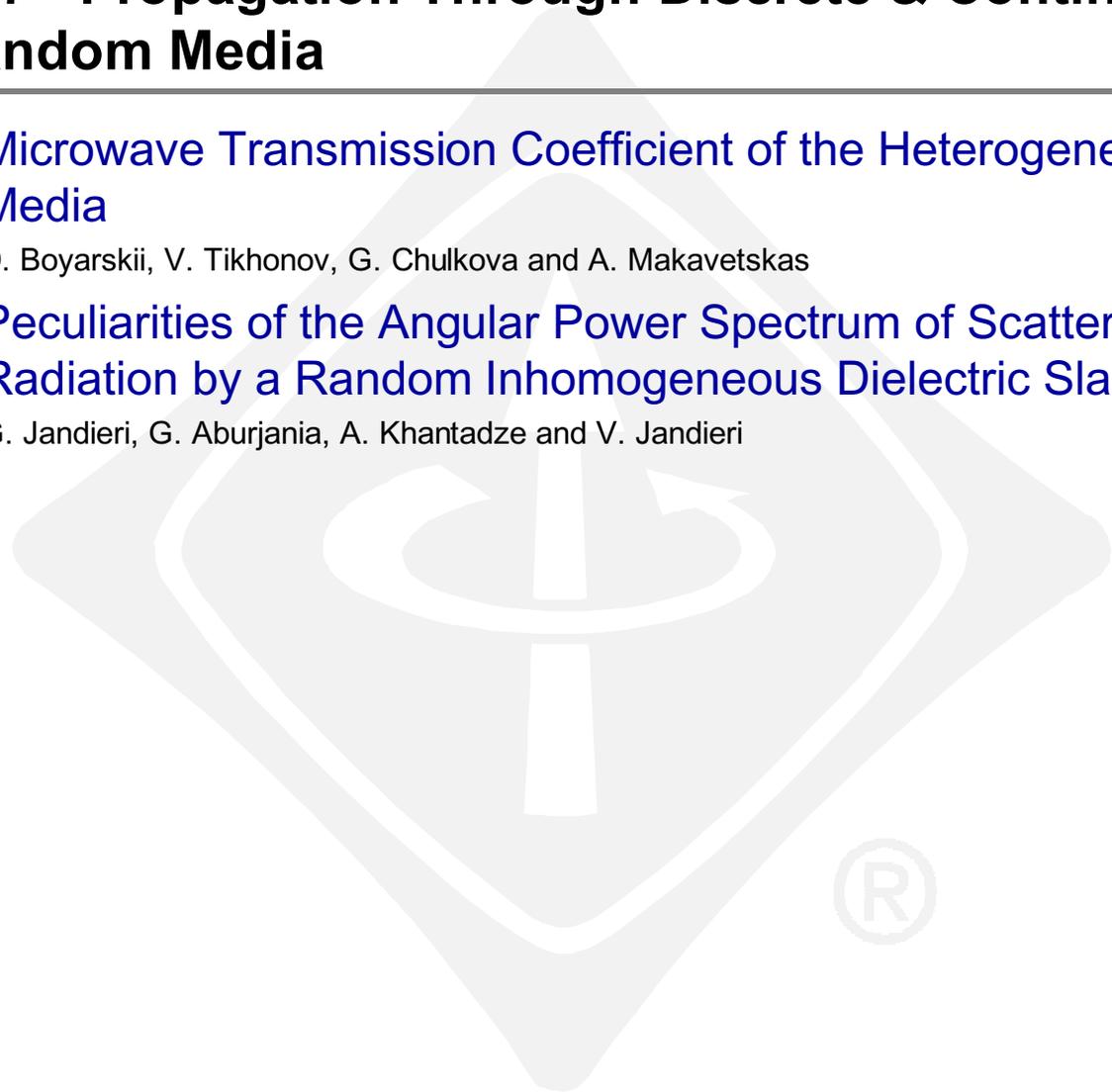
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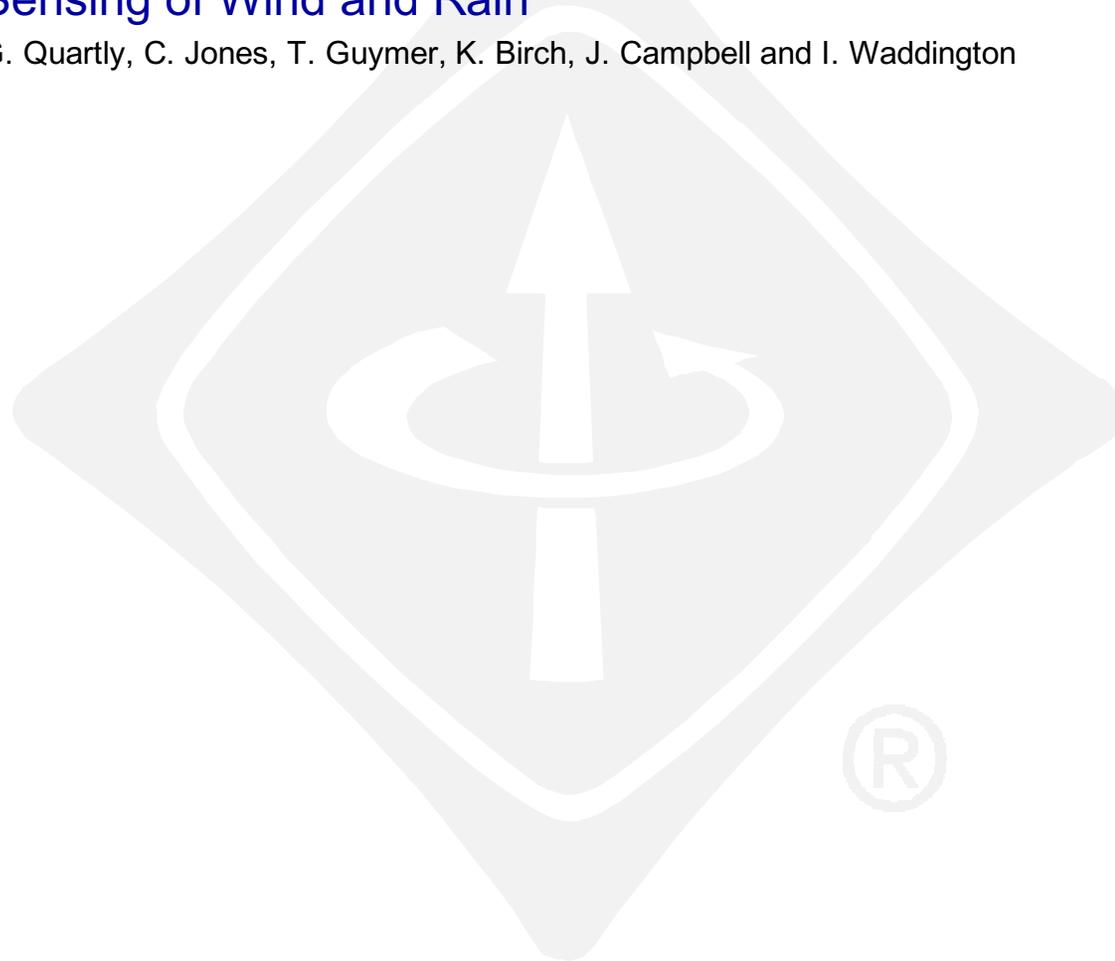
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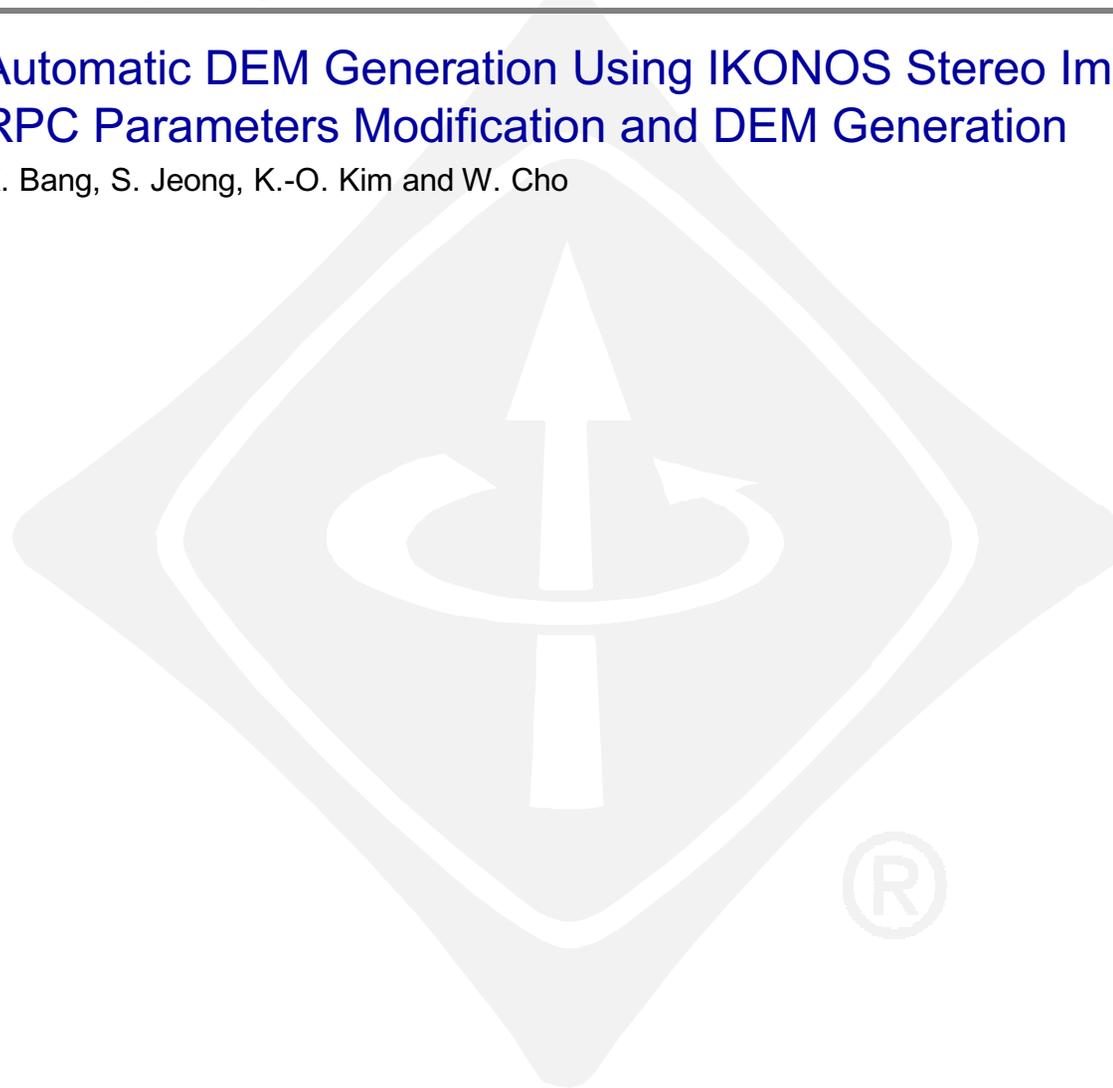
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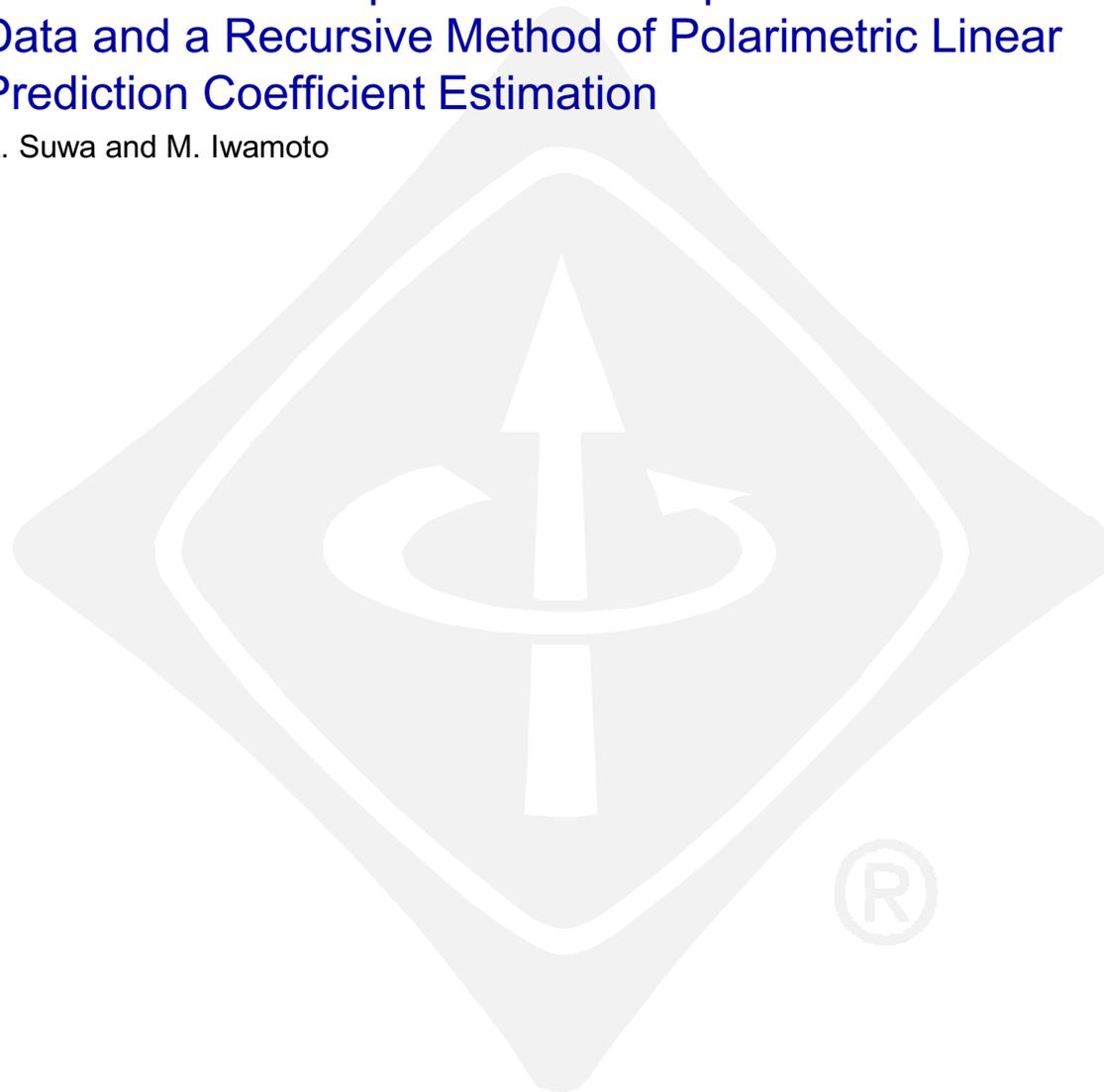
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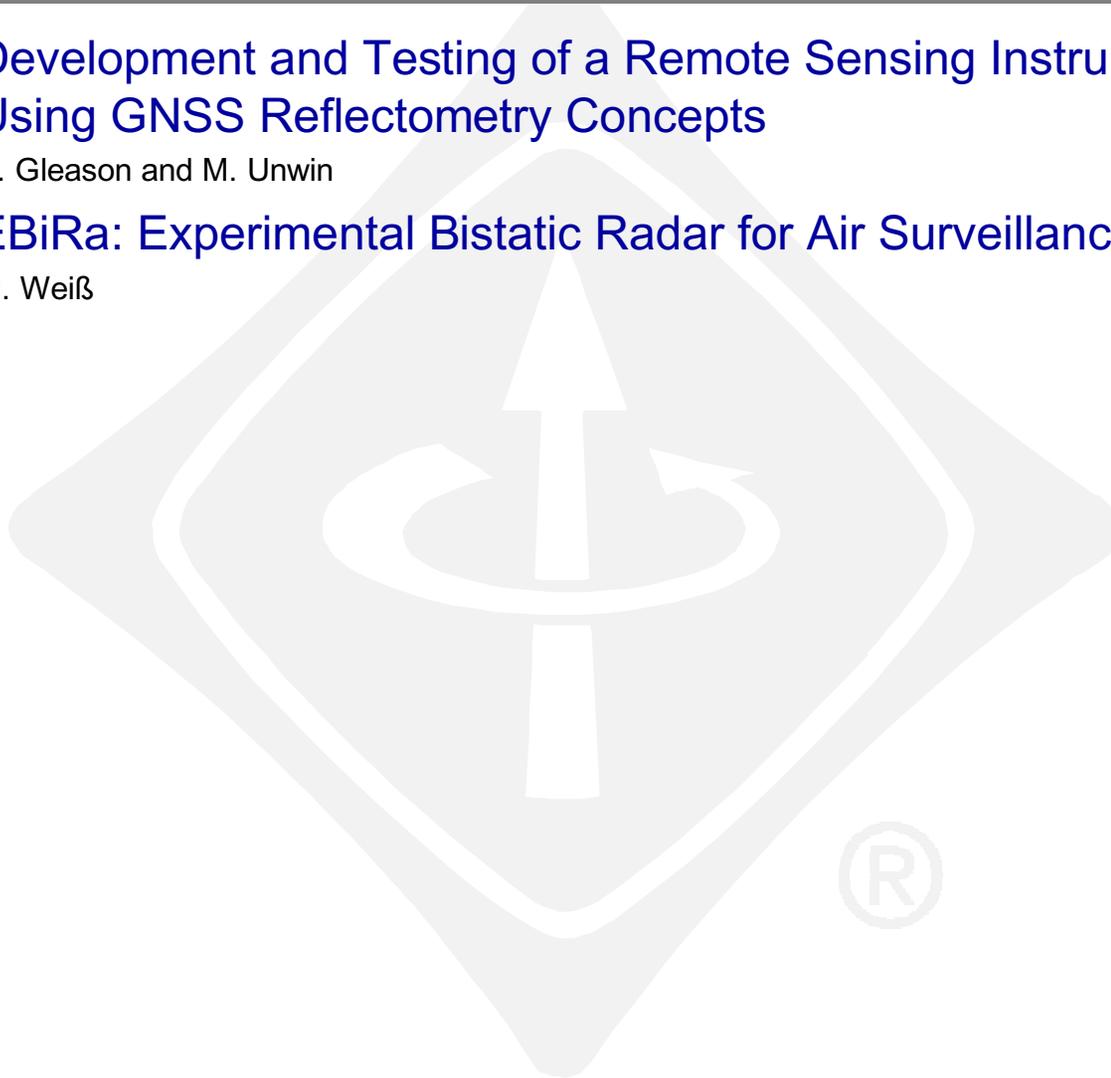


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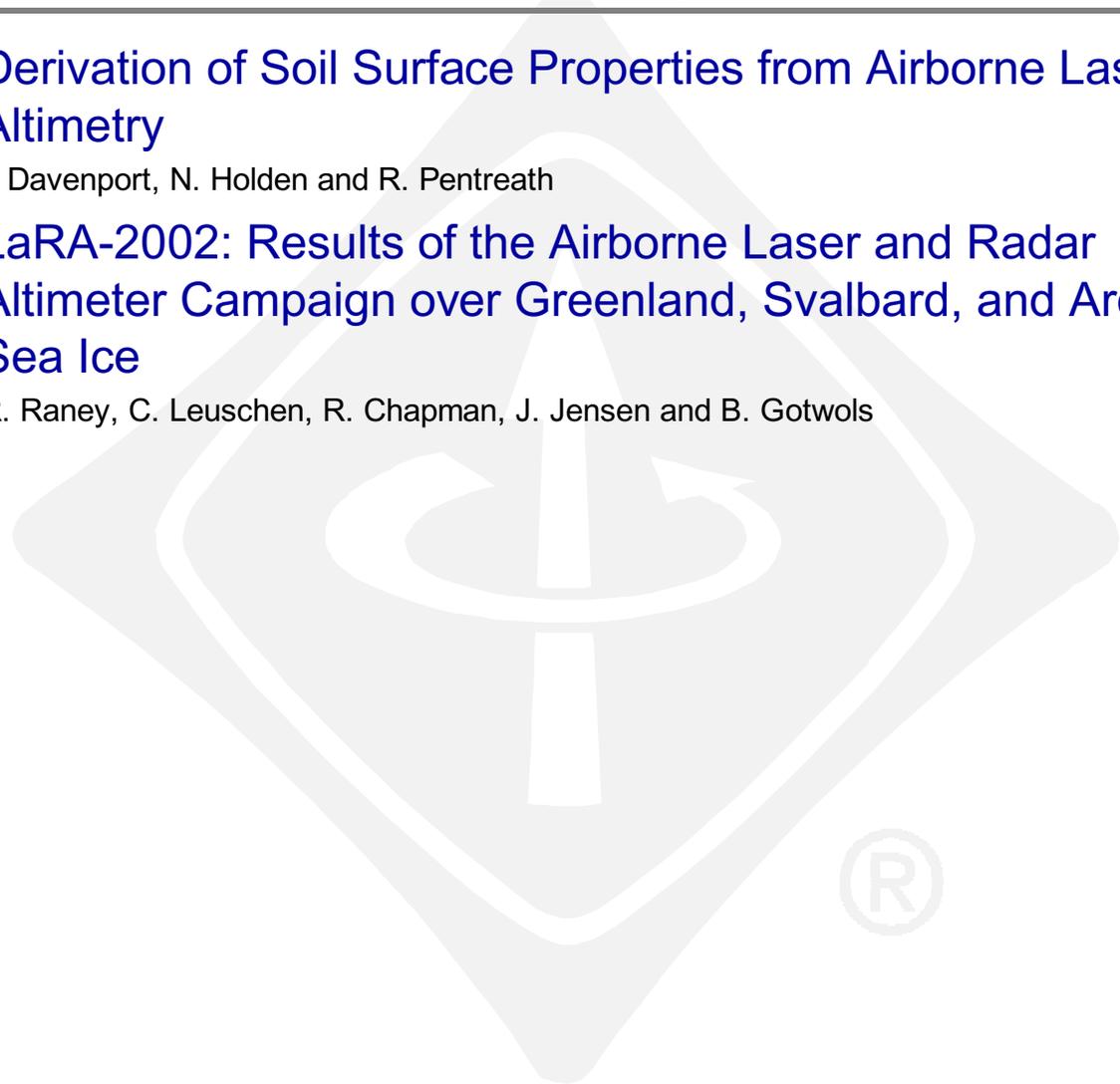


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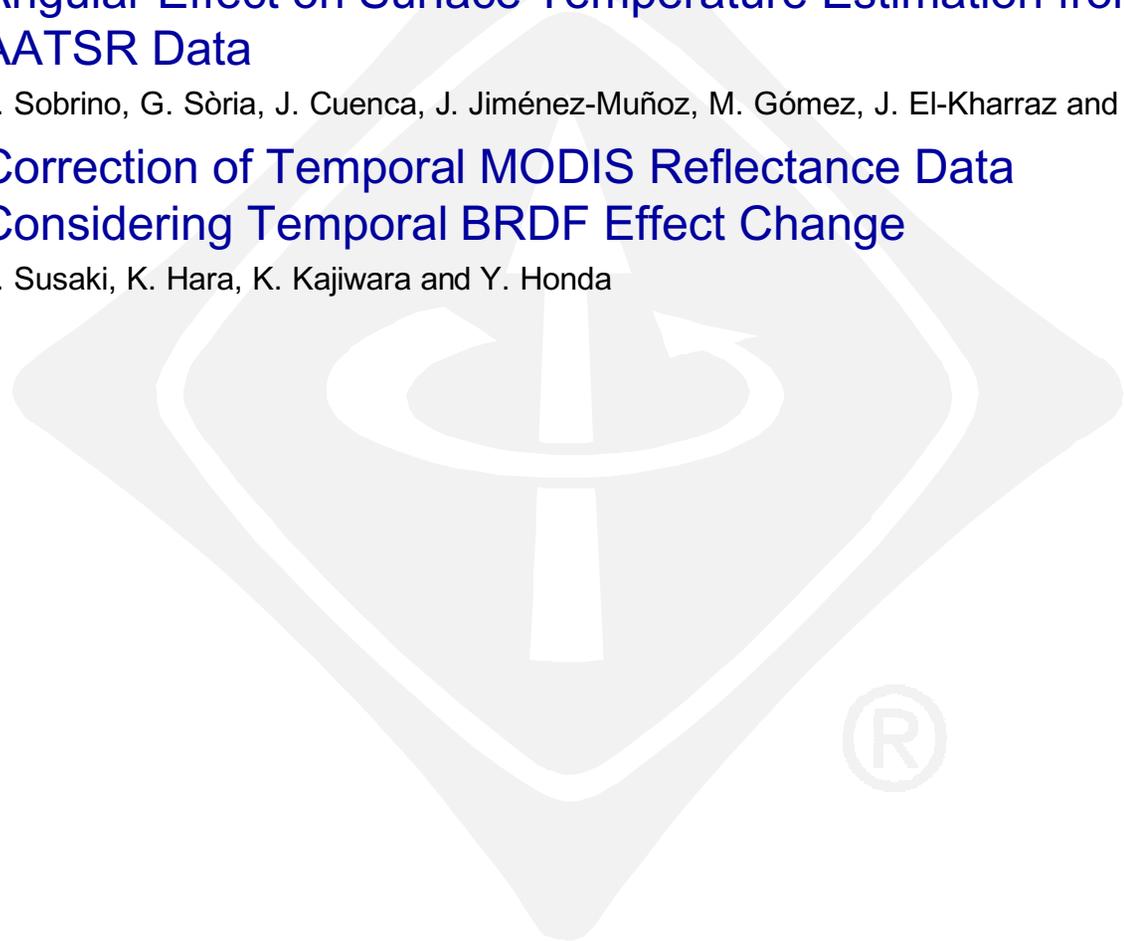
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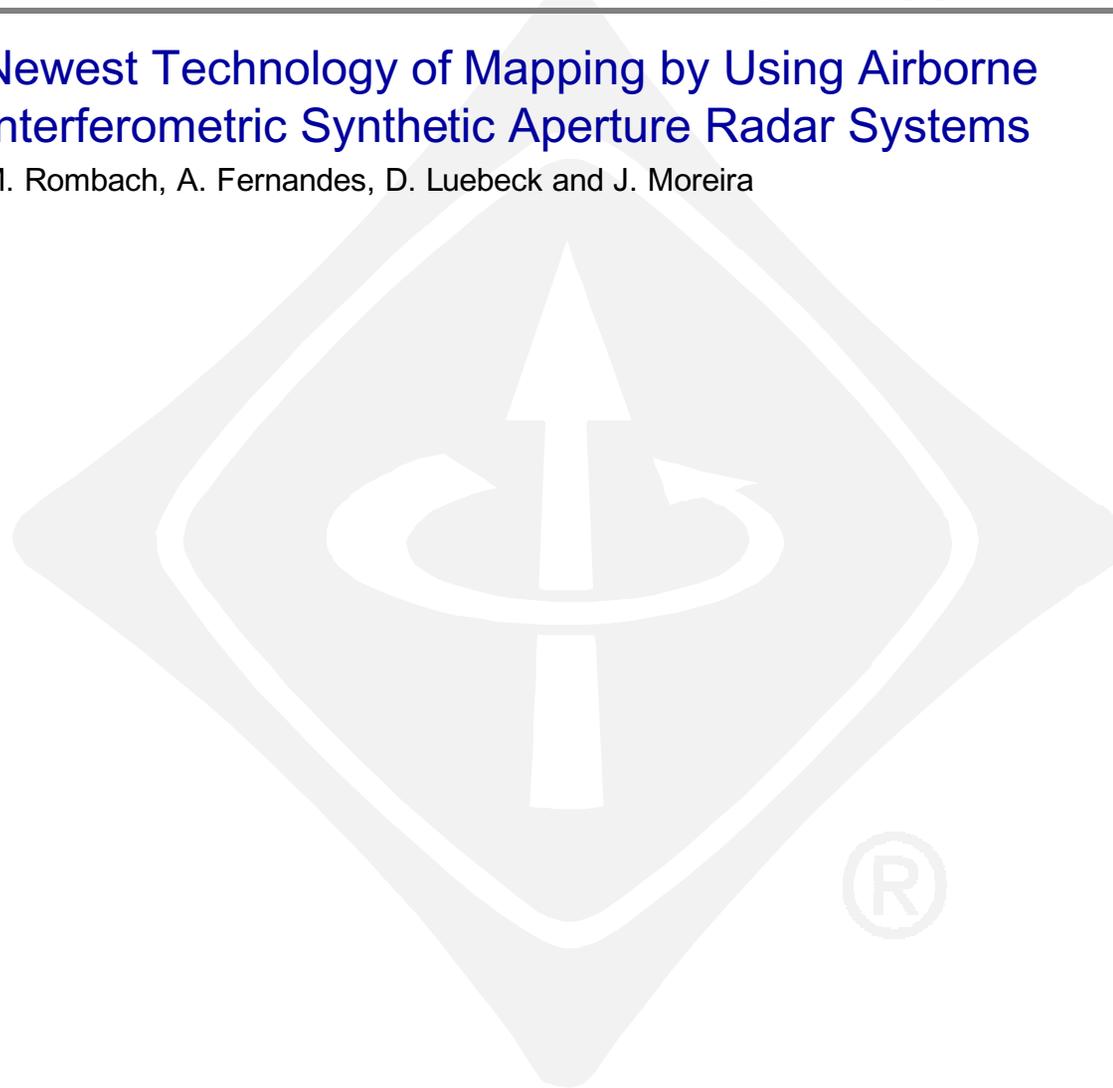
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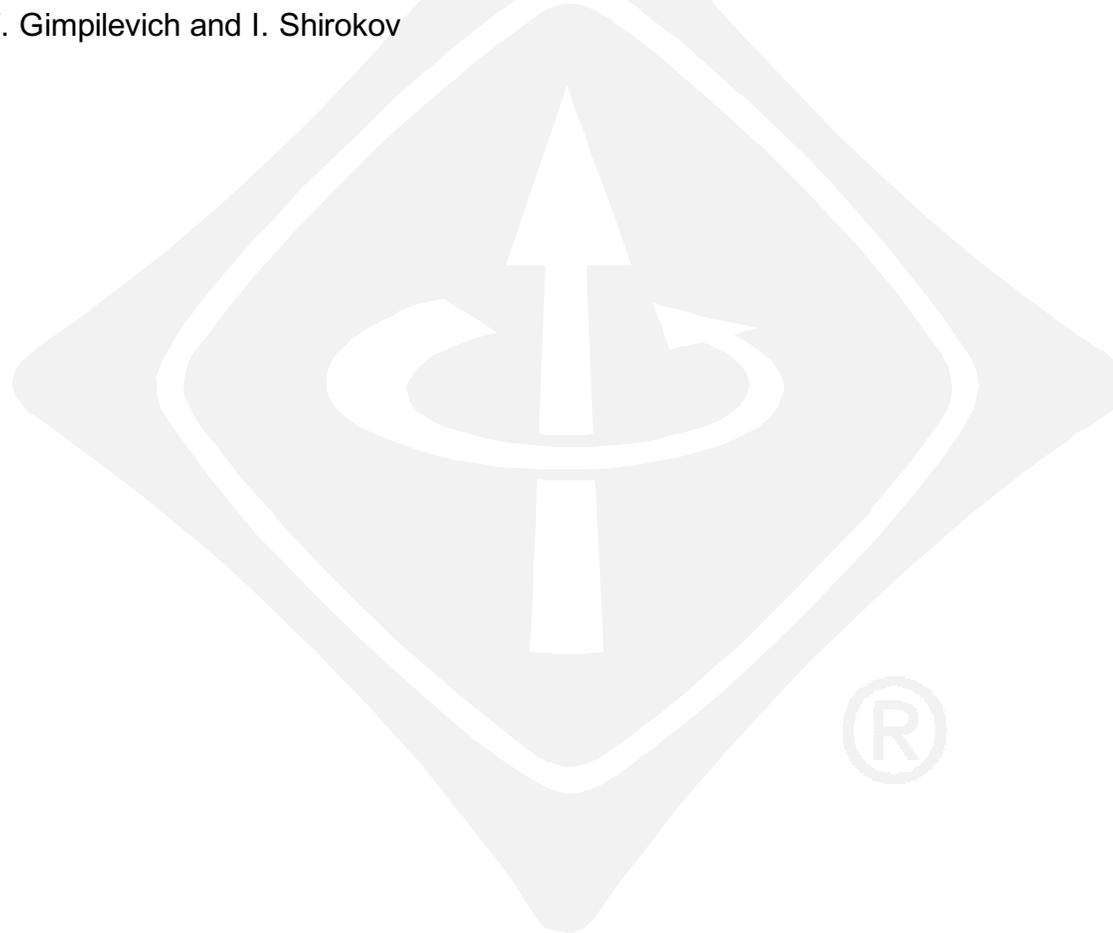
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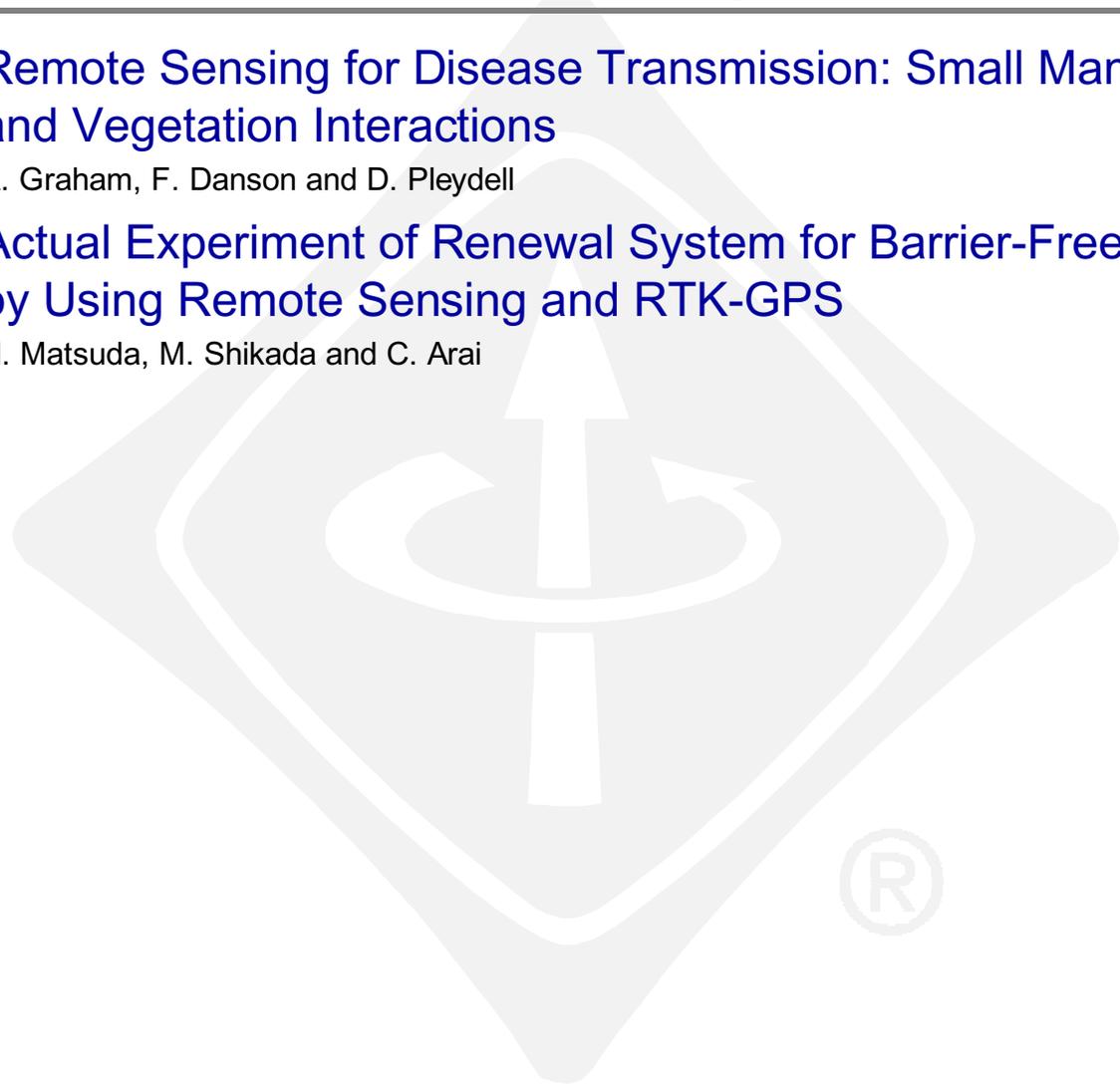


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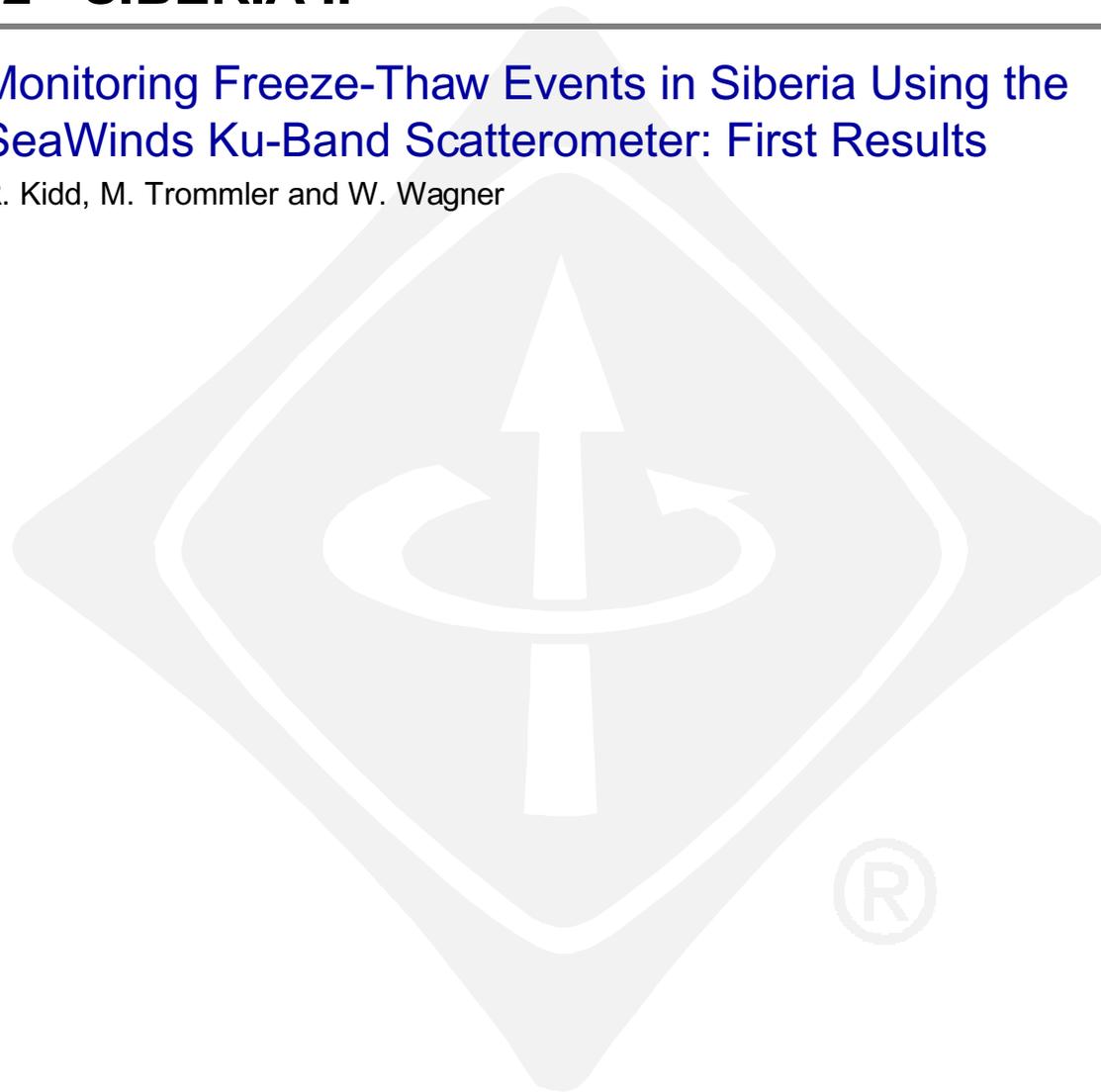
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<b>MO05_17:00</b>	<b>A Comparative Analysis of Data on Multiyear Sea Ice Distribution in the Arctic as Retrieved from Satellite Passive Microwave Radiometer and Radar Images</b> <i>Alexandrov, V.Y., O.M. Johannessen, I.V. Samsonov, L.P. Bobylev and K. Kloster</i>	I: 77 - 79
<b>HYPERSPECTRAL PROCESSING AND ANALYSIS</b>		
<b>MO06_14:20</b>	<b>Mitigating the Effects of Bad and Noisy Detectors on Hyperspectral Data</b> <i>Winter, E.M.</i>	I: 80 - 82
<b>MO06_14:40</b>	<b>Removing Thin Cirrus Cloud Effects in Hyperion Data Using the 1.38 and 1.87 <math>\mu</math>m Water Vapor Absorption Bands</b> <i>Goetz, A.F.H., K.F. Evans and M. Ferri</i>	I: 83 - 85
<b>MO06_15:00</b>	<b>Cloud Cover Detection Algorithm for EO-1 Hyperion Imagery</b> <i>Griffin, M., H.-H. Burke, D. Mandl and J. Miller</i>	I: 86 - 89
<b>MO06_15:40</b>	<b>Analysis of Hyperion Data with the FLAASH Atmospheric Correction Algorithm</b> <i>Felde, G.W., G.P. Anderson, T.W. Cooley, M.W. Matthew, S.M. Adler-Golden, A. Berk and J. Lee</i>	I: 90 - 92
<b>MO06_16:00</b>	<b>A New Algorithm for Atmospheric Correction of the Multiangular and Hyperspectral Data Acquired During the DAISEX Campaign</b> <i>Pedrós, R., J. Moreno, J.A. Martínez-Lozano, M.P. Utrillas and J.L. Gómez</i>	I: 93 - 95
<b>MO06_16:20</b>	<b>ORASIS Framework - Benefits to Working Within the Linear Mixing Model</b> <i>Bowles, J., W. Chen and D. Gillis</i>	I: 96 - 98
<b>MO06_16:40</b>	<b>Unmixing Analysis: Model Prediction Compared to Observed Results</b> <i>Kerekes, J., M.A. Glennon and R. Lockwood</i>	I: 99 - 102

## **RADARSAT-1**

- MO07\_14:00**    **RADARSAT-1 Image Quality Maintained in Extended Mission**  
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- MO07\_16:20**    **Terrain Interpretation from SAR Techniques**  
*Singhroy, V., P. Assouad, P. Barnett and K. Molch*    I: 106 - 108
- MO07\_16:40**    **Validation of the X-SAR SRTM DEM for ERS and JERS SAR Geocoding and 2-Pass Differential Interferometry in Alpine Regions**  
*Strozzi, T., U. Wegmüller, A. Wiesmann and C. Werner*    I: 109 - 111
- MO07\_17:00**    **Analysis of X-SAR SRTM Elevation Data to Estimate Surface Cover Heights over Land Areas**  
*Weydahl, D.J., J. Sagstuen, Ø. Dick, H. Rønning and L. Hansen*    I: 112 - 114

## **ROUGH SURFACE SCATTERING**

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*Bourlier, C., N. Déchamps and G. Berginc*    I: 115 - 117
- MO08\_14:00**    **Numerical Simulations of Scattering from Multilayers Separated by One-Dimensional Rough Interfaces**  
*Déchamps, N., C. Bourlier, N. de Beauhoudrey and S. Toutain*    I: 118 - 120
- MO08\_14:20**    **Approximate Solution for Scattering from Rough Surface with Small Slopes**  
*Saillard, M., and G. Soriano*    I: 121 - 123
- MO08\_14:40**    **Study of Microwave Signatures of Soils with Various Rough Surface Spectra Based on 3-D Numerical Simulations of Maxwell Equations**  
*Li, Q., L. Tsang and L. Zhou*    I: 124 - 126
- MO08\_15:00**    **A 2-D Extended Boundary Condition Method for Scattering from Perfectly Conducting Fractal Surfaces**  
*Franceschetti, G., A. Iodice, D. Riccio and G. Ruello*    I: 127 - 129
- MO08\_15:40**    **Monte-Carlo Simulations of Surface Clutter in GPR Scenarios**  
*Yarovoy, A.G.*    I: 130 - 132
- MO08\_16:00**    **Scattering by Rough Surfaces: Comparison Between Simulations and Experimental Radar Data**  
*Baudier, C., and R. Dusséaux*    I: 133 - 135
- MO08\_16:20**    **IEM Sea Surface Scattering and the Generalized  $p$ -power Spectrum**  
*Marrazzo, M., R. Sabia and M. Migliaccio*    I: 136 - 138
- MO08\_16:40**    **Small Slope Approximation Modeling of Scattering from a Spilling Breaker Wave Crest**  
*West, J.C.*    I: 139 - 141

## **AN EARTH SCIENCE VISION: GLOBAL UNDERSTANDING OF THE COMPLEXITIES OF OUR PLANET**

- MO09\_14:00**    **Ocean and Atmosphere: Predicting Monthly to Seasonal Climate Variability and the Oceanic and Atmospheric Causes and Effects**  
*Schubert, S., M. Rienecker, M. Mlynzcak, T. Miller and M. Schoeberl*    I: 142 - 144
- MO09\_14:20**    **The Biosphere: A Decadal Vision**  
*Peterson, D.L., P.J. Curran, M. Mlynzcak and R. Miller*    I: 145 - 150
- MO09\_15:00**    **An Examination of Anthropogenic Climate Forcing in the 21st Century: Greenhouse Gases and Aerosols - Direct and Indirect**  
*Prather, M.*    I: 151 - 154

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*Baret, F., R., Vintila*     I: 155 - 157
- MO10\_15:00**     **Examination of Crop Characteristics using Microwave Data**  
*Dabrowska-Zielinska, K., Y. Inoue, W. Kowalik and M. Gruszczynska*     I: 158 - 160

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## PART II: OPTICAL STEREOSCOPY AND RADARGRAMMETRY

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*Le Moigne, J., A. Cole-Rhodes, R. Eastman, J. Morissette, N.S. Netanyahu and H. Stone*     I: 161 - 163
- MO11\_14:00**     **Automatic Image Registration and Color Merging for SPOT5 Imagery**  
*Kwoh, L.K., and X. Huang*     I: 164 - 166
- MO11\_14:20**     **A New Image Registration Method for Multi-frequency Airborne High-resolution SAR Images**  
*Zhang, H., C. Wang, Y. Tang and Z. Liu*     I: 167 - 169
- MO11\_14:40**     **An Application of Stereomatching to the Problem of Geo-Referencing Historical Air-Photos**  
*O'Dwyer, S., P. Lewis and J.-P. Muller*     I: 170 - 172
- MO11\_15:00**     **Using Graph Matching to Compare VHR Satellite Images with GIS Data**  
*Gautama, S. and A. Borghgraef*     I: 173 - 175
- MO11\_16:20**     **Use of Texture Filters to Improve the Quality of Digital Elevation Models Derived from Stereo Imagery**  
*Mohamed, M.A. and K.-E. Kim*     I: 176 - 178
- MO11\_16:40**     **Radargrammetry and Space Triangulation for DEM Generation and Image Ortho-Rectification**  
*Wegmüller, U., C. Werner, A. Wiesmann and T. Strozzi*     I: 179 - 181
- MO11\_17:00**     **Radargrammetry of Opposite-Side Stereo Magellan Synthetic Aperture Radar on Venus**  
*Lee, H., J.V. Morgan and M.R. Warner*     I: 182 - 184

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- TU01\_08:20**     **Airborne X-band SAR Imaging with 10 cm Resolution - Technical Challenge and Preliminary Results**  
*Cantalloube, H.M.J. and P. Dubois-Fernandez*     I: 185 - 187
- TU01\_09:00**     **Classification of Urban SAR Imagery using Object Oriented Techniques**  
*Corr, D.G., A. Walker, U. Benz, I. Lingenfelder and A. Rodrigues*     I: 188 - 190
- TU01\_09:20**     **The Estimation of Ship Velocity from SAR Imagery**  
*Tunaley, J.K.E.*     I: 191 - 193
- TU01\_09:40**     **The SSCM for Ship Characterization Using Polarimetric SAR**  
*Touzi, R. and F. Charbonneau*     I: 194 - 196
- TU01\_10:40**     **Multiscale Classification and Filtering of SAR Images Using Dempster-Shafer Theory**  
*Foucher, S., J.-M. Boucher and G.B. Béné*     I: 197 - 199
- TU01\_11:00**     **Coherence Estimation from Multilook Detected SAR Images**  
*Aiazzi, B., L. Alparone, S. Baronti and A. Garzelli*     I: 200 - 202
- TU01\_11:20**     **Unsupervised Classification of Polarimetric SAR Images Using Neural Networks**  
*Yahia, M., and Z. Belhadj*     I: 203 - 205
- TU01\_11:40**     **Novel Registration Technique for InSAR and InSAR**  
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*Kircher, M., A. Roth, N. Adam, B. Kampes and H.J. Neugebauer* I: 209 - 211
- TU02\_09:20 Land Subsidence Monitoring Service in the Lagoon of Venice**  
*Strozzi, T., L. Tosi, U. Wegmüller, C. Werner, P. Teatini and L. Carbognin* I: 212 - 214
- TU02\_09:40 Monitoring Slow Mass Movements with the Permanent Scatterers Technique**  
*Allievi, J., C. Ambrosi, M. Ceriani, C. Colesanti, G.B. Crosta, A. Ferretti and D. Fossati* I: 215 - 217
- TU02\_10:20 A Ground-based Interferometer for the Safety Monitoring of Landslides and Structural Deformations**  
*Antonello, G., N. Casagli, P. Farina, J. Fortuny, D. Leva, G. Nico, A.J. Sieber and D. Tarchi* I: 218 - 220
- TU02\_11:20 Contributions of InSAR to Study Active Tectonics of Taiwan**  
*Pathier, E., J. Angelier, B. Fruneau and B. Deffontaines* I: 221 - 223

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*Engen, G., H. Johnsen and B. Chapron* I: 224 - 226
- TU03\_08:40 Frequency-Wavenumber Spectra of Shoaling Ocean Waves**  
*Dugan, J.P.* I: 227 - 229
- TU03\_09:00 SAR Measurements of Ocean Wind and Wave Fields in Hurricanes**  
*Horstmann, J., P. Vachon, S. Lehner and D. Hoja* I: 230 - 232
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*Monaldo, F., D. Thompson and N. Winstead* I: 233 - 235
- TU03\_09:40 RADARSAT Mapping of BORA/SIROCCO Winds in the Adriatic Sea**  
*Askari, F., R.P. Signell, J. Chiggiato and J. Doyle* I: 236 - 238
- TU03\_10:20 The Development and Application of a Sea Surface Stress Model Function for the QuikSCAT and ADEOS-II SeaWinds Scatterometers**  
*Bourassa, M.A., and D.E. Weissman* I: 239 - 241
- TU03\_11:00 Comparison of Wind Vectors and Air-Sea Temperature Differences Measured during SHOWEX**  
*Plant, W.J., R. Foster, H. Graber, W.M. Drennan, L. Mahrt, V. Irisov and D.G. Long* I: 242 - 244
- TU03\_11:20 Microwave Brightness Temperature Variations Caused by Ocean Internal Waves**  
*Irisov, V., and O. Godin* I: 245 - 247
- TU03\_11:40 Air-sea Interaction with Multiple Sensors - Seasat Legacy**  
*Timothy Liu, W., and Wenqing Tang* I: 248 - 250

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- TU04\_09:20 Identifying Main Crop Classes in an Irrigated Area Using High Resolution Image Time Series**  
*Simonneaux, V., and P. François* I: 252 - 254
- TU04\_09:40 Land Use/Cover Change in the Red Soil Region, China During the Period 1988-2000**  
*Ke, C., L. King and J. Tong* I: 255 - 257

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<b>TU04_11:00</b>	<b>Mapping Wetlands of the North American Boreal Zone from Satellite Radar Imagery</b> <i>Moghaddam, M., K. McDonald, J. Cihlar and W. Chen</i>	I: 261 - 263
<b>TU04_11:20</b>	<b>Development of 500 Meter Vegetation Continuous Field Maps Using MODIS Data</b> <i>Hansen, M.C., R.S. DeFries, J.R.G. Townshend, M. Carroll, C. Dimiceli and R.A. Sohlberg</i>	I: 264 - 266
<b>TU04_11:40</b>	<b>The Use of GIS and Satellite Remote Sensing Techniques for the Management of Inland Dry Valley Systems of the Sahel: The Case of the Watershed Toposequence of Tanda, Niger</b> <i>Manu, A., Y.A. Twumasi, T.L. Coleman and I. Zanguina</i>	I: 267 - 269

#### SEA ICE INFORMATION FROM NEWLY MULTI-SENSOR SATELLITE DATA

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<b>TU05_10:20</b>	<b>Radiometric Measurements of Air-Sea and Air-Ice Temperature Differences in the Arctic</b> <i>Minnett, P.J.</i>	I: 273 - 275

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<b>TU06_09:00</b>	<b>ICE: An Automated Statistical Approach to Identifying Endmembers in Hyperspectral Images</b> <i>Berman, M., H. Kiiveri, R. Lagerstrom, A. Ernst, R. Dunne and J. Huntington</i>	I: 279 - 283
<b>TU06_09:20</b>	<b>EVEOSD Forest Information Products from AVIRIS and Hyperion</b> <i>Goodenough, D.G., H. Chen, A. Dyk, T. Han, S. McDonald, M. Murdoch, K.O. Niemann, J. Pearlman and C. West</i>	I: 284 - 287
<b>TU06_10:20</b>	<b>Support Vector Machines for Hyperspectral Image Classification with Spectral-Based Kernels</b> <i>Mercier, G., and M. Lennon</i>	I: 288 - 290
<b>TU06_10:40</b>	<b>H-COMP: A Tool for Quantitative and Comparative Analysis of Endmember Identification Algorithms</b> <i>Plaza, J., A. Plaza, P. Martínez and R. Pérez</i>	I: 291 - 293
<b>TU06_11:00</b>	<b>Compressed Hyperspectral Imagery for Forestry</b> <i>Dyk, A., D.G. Goodenough, S. Thompson, C. Nadeau, A. Hollinger and S.-E. Qian</i>	I: 294 - 296
<b>TU06_11:20</b>	<b>Adaptive Feature Selection for Hyperspectral Data Analysis Using a Binary Hierarchical Classifier and Tabu Search</b> <i>Korycinski, D., M. Crawford, J.W. Barnes and J. Ghosh</i>	I: 297 - 299

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<b>TU07_08:40</b>	<b>SPOT5 Geometric Image Quality</b> <i>Bouillon, A., E. Breton, F. De Lussy and R. Gachet</i>	I: 303 - 305
<b>TU07_09:00</b>	<b>SPOT5 Radiometric Image Quality</b> <i>Lebègue, L., V. Pascal, A. Meygret and D. Léger</i>	I: 306 - 308

TU07_09:40	<b>Performance Analysis of DEM Automatic Extraction from SPOT5 Sensors</b> <i>Nonin, P., and S. Piccard</i>	I: 309 - 311
TU07_10:20	<b>Pushing the Limits of SPOT HRV Resolution with Steered Viewing Modes</b> <i>Kubik, P., P. Duchon and I. Sebbag</i>	I: 312 - 314
TU07_10:40	<b>Super Resolution: Quincunx Sampling and Fusion Processing</b> <i>Latry, C., and B. Rougé</i>	I: 315 - 317
TU07_11:00	<b>Image De-blurring and Application to SPOT5 THR Satellite Imaging</b> <i>Dhéréte, P., and B. Rougé</i>	I: 318 - 320
TU07_11:40	<b>SPOT Ground Segment Operational Performances</b> <i>Delclaux, P.</i>	I: 321 - 323

#### STUDENT PRIZE PAPER COMPETITION

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TU08_08:40	<b>Estimation of Soil Moisture using RADARSAT Repeat-passes</b> <i>Ramnath, V.K., R.L. King, N.H. Younan and J. Shi</i>	I: 327 - 329
TU08_09:00	<b>Classification and Retrieval of Dry Snow Parameters by Means of SMM/I Data and Artificial Neural Networks</b> <i>Tedesco, M., P. Pampaloni, J. Pulliainen and M. Hallikainen</i>	I: 330 - 332
TU08_09:20	<b>Vegetation Canopy Anisotropy at 1.4 GHz</b> <i>Hornbuckle, B.K., and A.W. England</i>	I: 333 - 335
TU08_09:40	<b>Microwave Emission and Scattering of Layered Foam Based on Monte Carlo Simulations of Dense Media</b> <i>Chen, D., L. Tsang and Y.-Q. Jin</i>	I: 336 - 338
TU08_10:20	<b>Radiometric Measurements of the Microwave Emissivity of Reproducible Breaking Waves</b> <i>Padmanabhan, S., and S.C. Reising</i>	I: 339 - 341
TU08_10:40	<b>Hyperspec - Analysis Of Handheld Spectroradiometer Data</b> <i>Mathur, A., L. Mann Bruce, A.M. Cheriyyadat and H.D.H. Lin</i>	I: 342 - 344
TU08_11:20	<b>A Spatial Information Grid Supported Prototype Telegeoprocessing System</b> <i>Wang, J., Y. Xue and H. Guo</i>	I: 345 - 347
TU08_11:40	<b>Automatic Selection by Means of Neural Networks of GOME Optimum Spectral Channels for the Retrieval of Ozone Vertical Profiles</b> <i>Iapaolo, M.F.</i>	I: 348 - 350

#### NPOESS

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TU09_08:40	<b>The NPOESS Spacecraft and Payload Suite: A Next Generation Low Earth Orbit Observation Platform</b> <i>Bloom, H.J.</i>	I: 357 - 359
TU09_09:00	<b>The National Polar-Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP): Leading the Change for NPOESS</b> <i>Wilczynski, P.A.</i>	I: 360 - 362

TU09_09:20	<b>NPOESS Field Terminal Segment</b>	<i>Overton, J.</i>	I: 363 - 365
TU09_09:40	<b>Defining Optimal Spatial Resolution for High-Spectral Resolution Infrared Sensors</b>	<i>Huang, H.-L., R. Frey, W.L. Smith, D.K. Zhou and H. Bloom</i>	I: 366 - 368
TU09_10:40	<b>VIIRS Sensor Performance</b>	<i>Schueler, C., J.E. Clement, L. Darnton, F. DeLuccia, T. Scalione and H. Swenson</i>	I: 369 - 372
TU09_11:00	<b>NPOESS Conical Microwave Imager/Sounder: Issues and Progress</b>	<i>Chauhan, N.</i>	I: 373 - 373
TU09_11:40	<b>Introduction, Overview and Status of the NPOESS Aerosol Polarimetry Sensor (APS)</b>	<i>Grano, V., S., Ubhayakar, J.M. Haas and C. Schueler</i>	I: 374 - 376
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TU10_08:40	<b>Estimating Large Area Wheat Evapotranspiration from Remote Sensing Data</b>	<i>Garatuza-Payan, J., A. Tamayo, C. Watts and J.C. Rodríguez</i>	I: 380 - 382
TU10_09:00	<b>Yield Prediction of Malting Barley Based on Meteorological Data</b>	<i>Hünting, K., C.J. Weissteiner and W. Kühbauch</i>	I: 383 - 385
TU10_09:20	<b>Using Time Series of SPOT VGT NDVI for Crop Yield Forecasting</b>	<i>Zhang, F., B. Wu and C. Liu</i>	I: 386 - 388
TU10_09:40	<b>Drought Monitoring from the Remotely Sensed Temperature and Vegetation Index in China</b>	<i>Xin, J., G. Tian, Q. Liu, L. Chen and X. Xin</i>	I: 389 - 391
TU10_10:40	<b>Estimation of Weed Infestation in Spring Crops using MODIS Data</b>	<i>Sultangazin, U., N. Muratova, P. Doraiswamy and A. Terekhov</i>	I: 392 - 394
TU10_11:00	<b>Solar Radiation Absorption of Wheat Cultivars Grown Under Different Nitrogen Levels and Water Deficit</b>	<i>Rudorff, B.F.T., M.A. Moreira, M.S. Targa, and J.G. Freitasc</i>	I: 395 - 397
TU10_11:20	<b>Integrating SAR and Optical Products for Crop Management (Isocrop) - Biophysical Parameter Retrieval Using X and L Band SAR Data</b>	<i>Anderson, C., C. Madrigal, R. Bryson, J. Alford and G. Holmes</i>	I: 398 - 400
<b>SOIL MOISTURE AND HYDROLOGICAL MODELING</b>			
TU11_08:40	<b>Soil Moisture Retrieval and AMSR-E Validation Using an Airborne Microwave Radiometer in SMEX02</b>	<i>Jackson, T.J., R. Bindlish, M. Klein, A.J. Gasiewski and E.G. Njoku</i>	I: 401 - 403
TU11_09:00	<b>Quantitative Analysis of SMEX'02 AIRSAR Data for Soil Moisture Inversion</b>	<i>van Zyl, J.J., E.G. Njoku and T.J. Jackson</i>	I: 404 - 406
TU11_09:20	<b>Soil Moisture Retrieval Through Changing Corn Using Active / Passive Microwave Remote Sensing</b>	<i>O'Neill, P.E., A. Joseph, G. De Lannoy, R. Lang, C. Utku, E. Kim, P. Houser, T. Gish</i>	I: 407 - 409
TU11_09:40	<b>Microwave Radiometric Measurements of Hydrological Parameters in Mountain Areas</b>	<i>Paloscia, S., G. Macelloni, P. Pampaloni, E. Santi, R. Ranzi, and S. Barontini</i>	I: 410 - 412

TU11_10:20	<b>Estimation of Soil Moisture with Repeat-pass L-band Radiometer Measurements</b> <i>Shi, J., E.G. Njoku, K.S. Chen, T. Jackson, P. O'Neill</i>	I: 413 - 415
TU11_10:40	<b>Estimation of Soil Moisture Using Data from Advanced Microwave Scanning Radiometer</b> <i>Lakshmi, V., J. Bolten, U. Narayan and T.J Jackson</i>	I: 416 - 418
TU11_11:00	<b>The Influence of Soil Moisture Upon the Geothermal Climate Signal</b> <i>England, A.W., X. Lin, J. Smerdon and H. Pollack</i>	I: 419 - 421

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TU01_14:00	<b>Pi-SAR Image Analysis using Polarimetric Scattering Parameters and Total Power</b> <i>Kimura, K., Y. Yamaguchi and H. Yamada</i>	I: 425 - 427
TU01_14:20	<b>Polarization Orientation Estimation and Applications: A Review</b> <i>Lee, J.S., D.L. Schuler, T.L. Ainsworth and W.-M. Boerner</i>	I: 428 - 430
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WE05_09:40	<b>Seasonal Polarimetric Measurements of Soil Moisture Using Tower-Based GPS Bistatic Radar</b> <i>Zavorotny, V., D. Masters, A. Gasiewski, B. Bartram, S. Katzberg, P. Axelrad and R. Zamora</i>	II: 781 - 783
WE05_10:20	<b>GALILEO Signal Based Bistatic System for Avalanche Prediction</b> <i>Cherniakov, M., T. Zeng and E. Plakidis</i>	II: 784 - 786
WE05_11:00	<b>Topics in Passive Bistatic Remote Sensing</b> <i>Terzuoli, A.J., Jr., P. Gilgallon and P. Howland</i>	II: 787 - 787
WE05_11:20	<b>Millimeter-Wave Polarimetric Bistatic Radar Scattering from Rough Soil Surfaces</b> <i>Nashashibi, A.Y., and F.T. Ulaby</i>	II: 788 - 790

## REGISTRATION AND COMBINATION OF IMAGERY

- WE06\_08:20**    **An Estimation of Seasonal True Color of Vegetation Cover for Satellite Image Mosaic Using Color Transfer Cube (CTC)**  
*Tanaka, S., T. Sugimura and H. Hashiba*    II: 791 - 793
- WE06\_08:40**    **Automated Image Matching Between Geocoded Landsat-TM Scenes and MOMS-2P Stereo Imagery for DEM and Orthoimage Production**  
*Lehner, M., and R. Müller*    II: 794 - 796
- WE06\_09:00**    **Rigorous Geometric Modeling and Correction of QuickBird Imagery**  
*Robertson, B.C.*    II: 797 - 802
- WE06\_09:20**    **Fast Orthorectification for Satellite Images Using Patch Backprojection**  
*Chen, L.-C., T.-A. Teo and J.-Y. Rau*    II: 803 - 805
- WE06\_10:20**    **Fusion of Airborne Laser Altimeter and RADARSAT Data for DEM Generation**  
*Hosford, S., N. Baghdadi, B. Bourguine, P. Daniels and C. King*    II: 806 - 808
- WE06\_10:40**    **Combination of Imagery- a Study on Various Methods**  
*Wang, Z., Z. Djemel and A. Costas*    II: 809 - 811
- WE06\_11:20**    **Approaches to Automate Image Geocoding and Registration**  
*Raggam, H., and M.D. Villanueva Fernandez*    II: 812 - 814

## IN-FLIGHT OCEAN ALTIMETRY

- WE07\_08:40**    **ENVISAT RA-2/MWR Cross-Calibration and Validation Final Results**  
*Benveniste, J.*    II: 815 - 817
- WE07\_09:00**    **Calibrating the Jason-1 Measurement System: Initial Results from the Corsica and Harvest Verification Experiments**  
*Bonnefond, P., B. Haines, G. Born, P. Exertier, S. Gill, G. Jan, E. Jeansou, D. Kubitschek, O. Laurain, Y. Ménard and A. Orsoni*    II: 818 - 820
- WE07\_10:40**    **Sampling the Mesoscale Ocean Surface Currents with Various Satellite Altimeter Configurations**  
*Emery, W.J., D. Baldwin and D. Matthews*    II: 821 - 823
- WE07\_11:00**    **SSALTO/DUACS and Operational Altimetry**  
*Le Traon, P.Y., G. Dibarboure and J. Dorandeu*    II: 824 - 826
- WE07\_11:40**    **Impact of Using Several Altimeters for Improving Numerical Wave Analyses and Forecasts**  
*Lefèvre, J.-M., C. Skandrani and P. Queffelec*    II: 827 - 829

## SNOW COVER

- WE08\_08:20**    **Combined Active and Passive Microwave Remote Sensing of Snow in Finland**  
*Hallikainen, M.T., P. Halme, M. Takala and J. Pulliainen*    II: 830 - 832
- WE08\_08:40**    **A Constrained Spectral Unmixing Approach to Snow-Cover Mapping in Forests Using MODIS Data**  
*Vikhamar, D., and R. Solberg*    II: 833 - 835
- WE08\_09:00**    **Validation of MODIS, VEGETATION and GOES+SSM/I Snow Cover Products Over Canada Based on Surface Snow Depth Observations**  
*Simic, A., R. Fernandes, R. Brown, P. Romanov, W. Park and D.K. Hall*    II: 836 - 838
- WE08\_09:20**    **Accuracy Assessment of Snow Surface Direct Beam Spectral Albedo Derived from Reciprocity Approach Through Radiative Transfer Simulation**  
*Li, S., and X. Zhou*    II: 839 - 841
- WE08\_09:40**    **A Comparison of Temperature Retrieval Algorithms for Snow Covered Surfaces**  
*Amlien, J., and R. Solberg*    II: 842 - 844

<b>WE08_10:20</b>	<b>On Estimation of Snow Water Equivalence Using L-band and Ku-band Radar</b> <i>Shi, J., S. Yueh and D. Cline</i>	II: 845 - 847
<b>WE08_10:40</b>	<b>The Microwave Alpine Snow Melting Experiment (MASME<sub>x</sub> 2002): A Contribution to the ENVISNOW Project</b> <i>Pampaloni, P., G. Macelloni, S. Paloscia, M. Tedesco, R. Ranzi, M. Tomirotti, A. Cagnati and A. Crepaz</i>	II: 848 - 850
<b>WE08_11:00</b>	<b>Radiometric and Geometric Correction of RADARSAT-1 Images Acquired in Alpine Regions for Mapping the Snow Water Equivalent (SWE)</b> <i>Dedieu, J.-P., Y. Gauthier, M. Bernier, S. Hardy, P. Vincent and Y. Durand</i>	II: 851 - 853
<b>WE08_11:20</b>	<b>Polarimetric Study of Scattering from Dry Snow Cover in Alpine Areas</b> <i>Martini, A., L. Ferro-Famil, E. Pottier</i>	II: 854 - 856
<b>WE08_12:00</b>	<b>New Approach for Snow Water Equivalent (SWE) Estimation Using Repeat Pass Interferometric SAR</b> <i>Engen, G., T. Guneriussen and Ø. Overrein</i>	II: 857 - 859
<b>EOS TERRA AND AQUA MODIS VALIDATED SCIENCE RESULTS</b>		
<b>WE09_08:20</b>	<b>An Overview of MODIS On-orbit Calibration and Instrument Performance</b> <i>Xiong, X., V.V. Salomonson and W.L. Barnes</i>	II: 860 - 862
<b>WE09_09:40</b>	<b>Multi-Year MODIS Observation of Global Aerosols from EOS Terra/Aqua Satellites: Validation, Variability and Application</b> <i>Chu, D.A., Y.J. Kaufman, L.A. Remer, D. Tanre and M.J. Jeong</i>	II: 863 - 865
<b>SPACEBORNE REMOTE SENSING OF PRECIPITATION</b>		
<b>WE10_08:20</b>	<b>A Decadal Climatology of Oceanic Precipitation Derived from TOPEX and TMR</b> <i>Chen, G.</i>	II: 866 - 868
<b>WE10_09:00</b>	<b>Development of a Classification Algorithm for Operational Polarimetric NEXRAD Radar</b> <i>Ryzhkov, A., D. Zrnica, R. Doviak and P. Zhang</i>	II: 869 - 871
<b>WE10_09:20</b>	<b>A Study on Cloud-Top Height Retrieval by Using MISR and MODIS Data</b> <i>Picón, A.J., and R. Vásquez</i>	II: 872 - 874
<b>WE10_09:40</b>	<b>Optimal Precipitation Estimation Using Multi-Sensor Microwave Datasets</b> <i>Nirala, M.L.</i>	II: 875 - 877
<b>WE10_10:20</b>	<b>Measuring Vertical Rainfall Velocity Through Spaceborne Doppler Radar: Performance Analysis and System Requirements</b> <i>Tanelli, S., E. Im, S.L. Durden and L. Facheris</i>	II: 878 - 880
<b>WE10_10:40</b>	<b>Numerical Simulation of Multiple Scattering Effects due to Convective Clouds on Satellite Radar Reflectivity at 14 and 35 GHz</b> <i>Marzano, F.S., G. Ferrauto, L. Roberti, S. Di Michele, A. Mugnai and A. Tassa</i>	II: 881 - 883
<b>WE10_11:00</b>	<b>Active Rain Gauge Concept For Moderate To Heavy Precipitation Using W-Band And S-Band Doppler Radars</b> <i>León-Colón, L.V., S.L. Cruz-Pol and S.M. Sekelsky</i>	II: 884 - 886
<b>WE10_11:40</b>	<b>Neural Networks and Tree Classifiers- An Application to Rainfall Estimation</b> <i>Bergès, J.C.</i>	II: 887 - 889
<b>WE10_12:00</b>	<b>Characterization of Rainfall Signature due to Multispectral Microwave Radiometric Data from Ground</b> <i>Marzano, F.S., D. Cimini, R. Ware, E. Fionda and P. Ciotti</i>	II: 890 - 892

## SOIL MOISTURE RETRIEVAL

- WE11\_08:20**     **Soil Moisture Retrievals Over the Southern Great Plains: Comparisons Between Experimental Remote Sensing Data and Operational Products**  
*Wood, E.F., H. Gao, M. Drusch, T. Jackson and R. Bindlish*     II: 893 – 895
- WE11\_08:40**     **Airborne GPS Bistatic Radar Soil Moisture Measurements During SMEX02**  
*Masters, D., S. Katzberg and P. Axelrad*     II: 896 - 898
- WE11\_09:00**     **Validation of Aircraft and Satellite Remote Sensing of Brightness Temperature and Derived Soil Moisture Using a Hydrologic/Radiobrightness Model**  
*Laymon, C.A., W.L. Crosson and A. Limaye*     II: 899 - 901
- WE11\_09:20**     **One-Dimensional Soil Moisture Profile, Surface Temperature and Canopy Temperature Retrieval by Assimilation of Ground Based Microwave Radiometer Measurements Over Bare Soil and Agricultural Crops**  
*Pathmathevan, M., T. Koike and X. Li*     II: 902 - 904
- WE11\_09:40**     **Passive Microwave Remote Sensing for Estimation of Rice Water Content in Vietnam**  
*Chung, D.M., B.D. Trong and V.T.L. Anh*     II: 905 - 907
- WE11\_10:20**     **SMOS: Analysis of Perturbing Effects Over Land Surfaces**  
*Kerr, Y.H., F. Sécherre, J. Lastenet and J.-P. Wigneron*     II: 908 - 910
- WE11\_10:40**     **Soil Moisture Retrieval for the SMOS Mission**  
*Petitcolin, F., J.-L. Vergely, P. Waldteufel and C. Cot*     II: 911 - 913
- WE11\_11:00**     **Soil Moisture Retrieval from L-band Measurements Over a Variety of Agricultural Crops**  
*Pardé, M., J.P. Wigneron, A. Chanzy, P. Waldteufel, S. Schmidl and N. Skou*     II: 914 - 916
- WE11\_11:20**     **An Algorithm to Retrieve Soil Moisture Using Synergistic Active/Passive Microwave Data on Bare Soil Surface**  
*Zhang, W., C. Wang, H. Zhang, K. Zhao, B. Liu and H. Dong*     II: 917 - 919
- WE11\_11:40**     **A Dynamic Estimate of a Soil Wetness Index for the Mackenzie River Basin from SSM/I Measurements**  
*Temimi, M., R. Leconte, F. Brissette and T. Toussaint*     II: 920 - 922

## POLARIMETRIC AND INTERFEROMETRIC DATA PROCESSING

- WE01\_14:00**     **Examination of Forest Polarimetric Backscattering with Coherent Cylinder Model**  
*Praks, J., J. Pulliainen, P. Ahtonen and M. Hallikainen*     II: 923 - 925
- WE01\_14:20**     **Visualisation of Cross-Polarised Response Patterns Over Short Vegetation**  
*Turner, D., and I.H. Woodhouse*     II: 926 - 928
- WE01\_14:40**     **Application of Gaussian Markov Random Field Model to Unsupervised Classification in Polarimetric SAR Image**  
*Hong, S., and W.M. Moon*     II: 929 - 931
- WE01\_15:00**     **Variograms: Practical Method to Process Polarimetric SAR Data**  
*Dong, Q., H. Guo, Y. Shao, Z. Li and C. Wang*     II: 932 - 934
- WE01\_15:40**     **Enhanced Resolution in 3-D Interferometric ISAR Imaging Using an Iterative SVA Procedure**  
*Xu, X., and R.M. Narayanan*     II: 935 - 937
- WE01\_16:00**     **A Change Detection Technique for Repeat Pass Interferometric SAR**  
*Preiss, M., D. Gray and N. Stacy*     II: 938 - 940
- WE01\_16:20**     **Velocity Field Retrieval from Long Term Coherent Points in Radar Interferometric Stacks**  
*Kampes, B.M., and N. Adam*     II: 941 - 944
- WE01\_16:40**     **Polarised Airsar Along Track Interferometry For Shoreline Change Modeling**  
*Marghany, M.*     II: 945 - 947
- WE01\_17:00**     **Phase Difference Based Multiple Acquisition Phase Unwrapping**  
*Fornaro, G., A. Pauciuolo and E. Sansosti*     II: 948 - 950

## NEAR SURFACE OCEAN PROCESSES

- WE02\_14:00**    **A Global Study of Diurnal Warming Using Infrared Satellite-derived Sea Surface Temperature**  
*Stuart-Menteth, A.C., I.S. Robinson and P.G. Challenor*    II: 951 - 953
- WE02\_14:20**    **Horizontal Sea Surface Temperature Gradients: MODIS Satellite Observations versus Reynolds Analysis**  
*Yuan, D., and A.K. Savtchenko*    II: 954 - 956
- WE02\_15:00**    **A Visible Record of Eddies in the Southern Mozambique Channel**  
*Quarty, G.D., and M.A. Srokosz*    II: 957 - 959
- WE02\_16:00**    **Current Maps and Bathymetry from P-band SAR Images: Preliminary Results**  
*Garello, R., J.-M. Le Caillec, H. Dupuis, V. Marieu, N. Durand, P. Dreuillet and C. Titin-Schnaider*    II: 960 - 962
- WE02\_16:40**    **Sea-surface Current Measurements with an X band Radar**  
*Braun, N., A. Bezuglov, G. Schymura and F. Ziemer*    II: 963 - 965
- WE02\_17:00**    **SAR Observations of Typical Phenomena in the Black Sea Shore Area**  
*Lavrova, O.Y., T.Y. Bocharova and M.I. Mityagina*    II: 966 - 968

## VEGETATION AND FOREST ANALYSIS

- WE03\_14:00**    **Multi-Sensor Approach for Assessing the Taiga-Tundra Boundary**  
*Ranson, K.J., G. Sun, V.I. Kharuk and K. Kovacs*    II: 969 - 971
- WE03\_14:20**    **Detection of Meter-Scale Land Cover Changes in the Presence of Highly Variable Terrain**  
*Stow, D., and L. Coulter*    II: 972 - 974
- WE03\_14:40**    **Improved Estimates of the Terrestrial Carbon Cycle by Coupling of a Process-based Global Vegetation Model (LPJ-DGVM) with a 17-year Time Series of Satellite-Observed fPAR Data (AVHRR)**  
*Schröder, B.E., and W. Lucht*    II: 975 - 977
- WE03\_15:40**    **Coarse Resolution Satellite Mapping of Insect-Induced Tree Defoliation and Mortality**  
*Fraser, R.H., and R. Latifovic*    II: 978 - 978
- WE03\_16:00**    **Mechanisms for Spectral Variation in the Range of Semi-Variograms**  
*O'Dwyer, S., and P. Lewis*    II: 979 - 981
- WE03\_16:20**    **Linearized Vegetation Indices Using a Formal Statistical Framework**  
*Ünsalan, C., and K.L. Boyer*    II: 982 - 984
- WE03\_17:00**    **CLAMP: Accounting for Leaf Clumping in Radiative Transfer Modelling**  
*Rochdi, N., F. Baret and M. Chelle*    II: 985 - 987

## USE OF REMOTE SENSING AND GIS TECHNOLOGIES FOR PLANNING, MANAGEMENT, MONITORING AND FORECASTING IN AFRICA

- WE04\_13:40**    **Investigation of the Impact of Urban Sprawl in Three Sahelian Cities Using Remotely-Sensed Information**  
*Manu, A., Y.A. Twumasi, T.L. Coleman and T. S. Jean-Baptiste*    II: 988 - 990
- WE04\_14:20**    **Spatial Integration of Geological Datasets for Predictive Hydrocarbon Studies in Murzuq Basin, SW Libya**  
*Zargani, S.S., R.A. Vaughan and A.A. Missallati*    II: 991 - 993
- WE04\_14:40**    **Application of GIS in Community Environmental Education in the Developing Countries: The Case of Ghana's Forest Region**  
*Gariba, S.A., and Y.A. Twumasi*    II: 994 - 996
- WE04\_15:00**    **Burn Scar Detection in Southern Africa Using a Bi-directional Reflectance Model Based Approach**  
*Rebelo, L., P. Lewis and D. Roy*    II: 997 - 999

<b>WE04_15:40</b>	<b>Malaria Environmental Risk Assessment in Eritrea</b> <i>Malone, J.B., E. Poggi, F.-J. Iguialada, D. Sintasath, T. Ghebremeskel, J.D. Corbett, J.C. McCarroll, P. Chinnici, J. Shililu, K. McNally, R. Downer, M. Perich and R. Ford</i>	II: 1000 - 1003
<b>WE04_16:00</b>	<b>Management of Watersheds with Landsat TM Data: A Case Study of the Volta River in Ghana</b> <i>Twumasi, Y.A., A. Manu and T.L. Coleman</i>	II: 1004 - 1006
<b>WE04_16:40</b>	<b>Application of Textural Analysis on Very High Resolution Panchromatic Images to Map Coffee Orchards in Uganda</b> <i>Lelong, C.C.D., and A. Thong-Chane</i>	II: 1007 - 1009
<b>WE04_17:00</b>	<b>Remotely Sensed Sugarcane Phenological Characteristics at Umfolozi South Africa</b> <i>Gers, C.J.</i>	II: 1010 - 1012
<b>MILITARY APPLICATIONS OF REMOTE SENSING</b>		
<b>WE05_13:40</b>	<b>Satellite Focus: Linking the United States Navy to High-Resolution Satellite Technologies</b> <i>Miller, S.D., J.D. Hawkins, T.F. Lee, F.J. Turk, K. Richardson and J.E. Kent</i>	II: 1013 - 1015
<b>WE05_14:20</b>	<b>Using Space-based Remote Sensing for Improved Global Navigation and Communication</b> <i>McCoy, R.P.</i>	II: 1016 - 1018
<b>WE05_14:40</b>	<b>Preliminary Design of a SAR-GMTI Processing System for RADARSAT-2 MODEX Data</b> <i>Beaulne, P.D., C.H. Gierull, C.E. Livinstone, I.C. Sikaneta, S.C.S. Gong and M. Quinton</i>	II: 1019 - 1021
<b>WE05_15:00</b>	<b>3D Global Ozone Proxy Fields and the NPOESS OMPS Assimilation Experiment, for Improved Numerical Weather Predictions for Military Operations</b> <i>Hornstein, J., D. Allen, C. Randall and S. Mango</i>	II: 1022 - 1025
<b>WE05_15:40</b>	<b>Current Navy Applications of Satellite Remotely Sensed Data</b> <i>Crout, R.L., and C. Kent</i>	II: 1026 - 1028
<b>WE05_16:00</b>	<b>Terrain Categorization Using a Background Spectral Library</b> <i>Cooley, T., J. Cipar, R. Lockwood and P. Grigsby</i>	II: 1029 - 1031
<b>WE05_16:40</b>	<b>Raw Data Based Two-Aperture SAR Ground Moving Target Indication</b> <i>Gierull, C.H., and I.C. Sikaneta</i>	II: 1032 - 1034
<b>DATA FUSION APPLICATIONS</b>		
<b>WE06_13:40</b>	<b>Science for Society: Delivering Earth System Science Knowledge for Decision Support in the Year 2025</b> <i>King, R.L., and R.J. Birk</i>	II: 1035 - 1037
<b>WE06_14:00</b>	<b>Automatic Structures Detection and Spatial Registration Using Multisensor Satellite Imagery</b> <i>Eugenio, F., E. Rovaris, J. Marcello and F. Marqués</i>	II: 1038 - 1040
<b>WE06_14:20</b>	<b>Multi Sensor Block Adjustment</b> <i>Toutin, T., R. Chénier and Y. Carbonneau</i>	II: 1041 - 1043
<b>WE06_14:40</b>	<b>Multisource Urban Classification: Joint Processing of Optical and SAR Data for Land Cover Mapping</b> <i>Macri Pellizzeri, T., P. Lombardo, P. Gamba and F. Dell'Acqua</i>	II: 1044 - 1046
<b>WE06_15:00</b>	<b>Parameter Estimation and Classification of Multi-scale Remote Sensing Data</b> <i>Storvik, G., R. Fjørtoft and A.H.S. Solberg</i>	II: 1047 - 1049
<b>WE06_15:40</b>	<b>A Physics-Based Remote Sensing Data Fusion Approach</b> <i>Shokr, M.</i>	II: 1050 - 1052
<b>WE06_16:00</b>	<b>Data Fusion Applications: Classification and Mapping</b> <i>Fabre, S., and P. Dhérété</i>	II: 1053 - 1055

WE06_16:20	<b>The Analysis and Application of Spline Interpolation for Multi-Sensor and Multi-Resolution Image Registration</b> <i>Gao, X., C. Wang, W. Zhang, J. Wu and H. Liu</i>	II: 1056 - 1058
WE06_16:40	<b>A Fusion Strategy for Extraction of Urban Road Nets from Multiple Images</b> <i>Hinz, S.</i>	II: 1059 - 1061
WE06_17:00	<b>Synergistic Use of DAIS Bands to Retrieve Land Surface Emissivity and Temperature</b> <i>Jiménez-Muñoz, J.C., J.A. Sobrino, J. El-Kharraz, M. Gómez, M. Romaguera and Guillem Sòria</i>	II: 1062 - 1064
WE06_17:00	<b>Assimilation of NASA Earth Science Results and Data in National Decision Support Systems</b> <i>Kaupp, V., C. Hutchinson and A. Tuyahov</i>	II: 1065 - 1070

#### PRESENT AND FUTURE ALTIMETERS

WE07_14:20	<b>Jason-1 Calibration Campaign at the Ibiza Island Area</b> <i>Martinez-Benjamin, J.J., M. Martinez-Garcia, J.M. Ferrandiz, M.I. Vigo-Aguiar, B. Perez, A. Nuñez Andres, M.A. Ortiz Castellon, E. Alvarez, M. Sevilla, G. Rodriguez, J. Talaya, J. Martin Davila and J. Garate</i>	II: 1071 - 1073
WE07_14:40	<b>Comparison of Microwave Radiometer Brightness Temperature Over a Hot Reference Area</b> <i>Tran, N., E. Obligis, L. Eymard and C. Ruf</i>	II: 1074 - 1076
WE07_15:00	<b>Preliminary Validation and Performance of the Jason Microwave Radiometer</b> <i>Brown, S., C. Ruf, S. Keihm and A. Kitiyakara</i>	II: 1077 - 1079
WE07_15:40	<b>Innovative Radar Altimeter Concepts</b> <i>Guijarro, J., R. Santoleri, B. Buongiorno Nardelli, L. Borgarelli, R. Croci, R. Venturini, G. Alberti, A. Caramagno and F. Pirondini</i>	II: 1080 - 1082
WE07_16:00	<b>Abyss-Lite: Improved Bathymetry from a Dedicated Small Satellite Delay-Doppler Radar Altimeter</b> <i>Raney, R.K., W.H.F. Smith, D.T. Sandwell, J.R. Jensen, D.L. Porter and E. Reynolds</i>	II: 1083 - 1085
WE07_16:20	<b>Future Radar Altimeter Concepts for Ocean Applications</b> <i>Phalippou, L., D. Cotton, J. Guijarro, Y. Menard and P. Vincent</i>	II: 1086 - 1088
WE07_16:40	<b>Phase B and Breadboard Results of the Ka-band Altimeter for Future Micro-Satellite Altimetry Missions</b> <i>Caubet, E., N. Steunou, M. Meerman, E. Thouvenot and P. Vincent</i>	II: 1089 - 1091

#### ELECTROMAGNETICS AND GPS

WE08_14:20	<b>Application of GPS in Airbone SAR Image Based Disaster Evaluation</b> <i>Chi, T., X. Zhang, C. Zhu and Y. Tan</i>	II: 1092 - 1093
WE08_14:40	<b>Deformation of the Angular Spectrum of Scattered Radiation in Turbulent Collision Magnetized Plasma</b> <i>Jandieri, G.V., V.G. Gavrilenko, Z.M. Diasamidze and V.G. Jandieri</i>	II: 1094 - 1096
WE08_15:00	<b>Estimation of Permittivity and Conductivity in Dispersive and Attenuating Media Using Multifrequency Technique</b> <i>Ferrández Pastor, F.J., and J.M. García Chamizo</i>	II: 1097 - 1099
WE08_16:00	<b>Dyadic Green's Function for a Gyro-Electric Medium</b> <i>Eroglu, A., and J. Kyoon Lee</i>	II: 1100 - 1102
WE08_16:20	<b>Conductivity of Leaves and Branches and Its Relation to the Spectral Dependence of Attenuation by Forests in Meter and Decimeter Band</b> <i>Chukhlantsev, A.A., A.M. Shutko, S.P. Golovachev and A.A. Chukhlantsev</i>	II: 1103 - 1105
WE08_17:00	<b>Soil Dielectric Spectroscopic Parameters Dependence on Humus Content</b> <i>Mironov, V.L., and P.P. Bobrov</i>	II: 1106 - 1108

## ENVISAT/ASAR

<b>WE09_13:40</b>	<b>ASAR Instrument Performance and Product Quality Status</b> <i>Rosich, B., M. Zink, R. Torres, J. Closa and C. Buck</i>	II: 1109 - 1111
<b>WE09_14:00</b>	<b>ASAR Image Mode Product Quality</b> <i>Meadows, P.J., and P.A. Wright</i>	II: 1112 - 1114
<b>WE09_14:20</b>	<b>ASAR AP Mode Performance and Applications Potential</b> <i>Hawkins, R.K., R. Touzi, J. Wolfe, P.J. Meadows, P. Pasquali and D. Flett</i>	II: 1115 - 1117
<b>WE09_14:40</b>	<b>The ASAR Wide Swath Mode Products</b> <i>Closa, J., B. Rosich and A. Monti-Guarnieri</i>	II: 1118 - 11:20
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<b>WE10_14:00</b>	<b>Cloud Liquid Water Retrievals from Aqua AMSU/HSB</b> <i>Rosenkranz, P.W.</i>	II: 1142 - 1144
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*Moccia, A., G. Rufino and M. De Luca*     III: 1452 - 1454
- TH02\_16:00     **Interpretations of the Omega-K Algorithm and Comparisons with other Algorithms**  
*Cumming, I.G., Y.L. Neo and F.H. Wong*     III: 1455 - 1458
- TH02\_16:20     **Radar Processing and Geometric Specificity of Bistatic Data**  
*Massonnet, D., J.-C. Souyris and J.-M. Gaudin*     III: 1459 - 1461
- TH02\_16:40     **Sliding Spotlight SAR Processing for TerraSAR-X using a New Formulation of the Extended Chirp Scaling Algorithm**  
*Mittermayer, J., R. Lord and E. Börner*     III: 1462 - 1464
- TH02\_17:00     **Wavenumber Domain SAR Focusing with Integrated Motion Compensation**  
*Reigber, A., A. Potsis, E. Alivizatos, N. Uzunoglu and A. Moreira*     III: 1465 - 1467

### REMOTE SENSING POTENTIAL TO SUPPORT MULTI-NATIONAL ENVIRONMENTAL CONVENTIONS

- TH03\_13:40     **Earth Observation Supporting Multilateral Environmental Agreements: The Initiatives of the European Space Agency**  
*Arino, O., D. Fernández-Prieto, M. Paganini, E. Volden and F.M. Seifert*     III: 1468 - 1470
- TH03\_14:00     **Support to Multi-national Environmental Conventions and Terrestrial Carbon Cycle Science by ALOS and ADEOS-II – the Kyoto and Carbon Initiative**  
*Rosenqvist, A., M. Shimada, T. Igarashi, M. Watanabe, T. Tadono and H. Yamamoto*     III: 1471 - 1473
- TH03\_14:20     **Remote Sensing to Support Australia's Commitment to International Agreements: A Role for Synthetic Aperture Radar**  
*Lucas, R.M., A. Lee, A.K. Milne, N. Cronin and M. Moghaddam*     III: 1477 - 1479

TH03_14:40	<b>Treaty Enforcement Services Using Earth Observation (TESEO) Theme Carbon-Main Results</b> <i>Häme, T., L. Sirro, Y. Rauste, H. Ahola, J. Van Brusselen, A. Schuck, U. Wegmüller, A. Wiesmann, I. Hippi and E. Volden</i>	III: 1480 - 1482
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TH03_15:40	<b>Operational Wetlands Monitoring for the Ramsar Convention: TESEO Powers a Breakthrough</b> <i>Wessels, J., D. Ball, D. Fernández-Prieto, and F. Ahern</i>	III: 1486 - 1488
TH03_16:00	<b>Desertification – A Land Degradation Support Service</b> <i>Holecz, F., C. Heimo, J. Moreno, J.-J. Goussard, D. Fernandez, J.L. Rubio, C. Erxue, E. Magsar, M. Lo, A. Chemini, F. Stoessel and A. Rosenqvist</i>	III: 1490 - 1492
TH03_16:20	<b>The SAHARASAR Project: Potential Support to Water Prospecting in Arid Africa by SAR</b> <i>Paillou, P., and A. Rosenqvist</i>	III: 1493 - 1495
TH03_16:40	<b>Building Environment for Gorilla: A New Action in the Joint UNESCOESA Initiative to Support the World Heritage Convention</b> <i>Fernández-Prieto, D., M. Hernandez, O. Arino, L. Fusco and P. Matos</i>	III: 1496 - 1498
Th03_17:00	<b>SIBERIA-II: Sensor Systems and Data Products for Greenhouse Gas Accounting</b> <i>Schmullius, C.C., S. Hese and Siberia-II Team</i>	III: 1499 - 1501
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TH04_13:40	<b>Empirical Evaluation of Four Microwave Radiative Forward Models Based on Ground-based Radiometer Data Near 20 and 30 GHz</b> <i>Cimini, D., F.S. Marzano, P. Ciotti, E.R. Westwater, S.J. Kehim and Y. Han</i>	III: 1502 - 1504
TH04_14:00	<b>Combining Microwave Radiometer and Wind Profiler Radar Measurements to Improve Accuracy and Resolution of Atmospheric Humidity Profiling</b> <i>Bianco, L., D. Cimini, F. Marzano and R. Ware</i>	III: 1505 - 1507
TH04_14:20	<b>Space and Time Variations of Atmosphere Brightness Temperature Observed by Satellite Radiometer in Ka band</b> <i>Bosisio, A.V.</i>	III: 1508 - 1510
TH04_16:00	<b>Expected Accuracy of the CO<sub>2</sub> Retrieval from IASI</b> <i>Chaumat, L., P. Prunet, B. Tournier and F.-R. Cayla</i>	III: 1511 - 1513
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TH05_14:00	<b>Adaptive Algorithms for the Fully-Automated Retrieval of Cloud and Aerosol Extinction Profiles from CALIPSO Lidar Data</b> <i>Young, S.A., M.A. Vaughan and D.M. Winker</i>	III: 1517 - 1519
TH05_14:20	<b>Retrieval of Cloud Emissivity and Particle Size in the Frame of the CALIPSO Mission</b> <i>Chomette, O., A. Garnier, J. Pelon, S. Ackerman, H. Chepfer, P. Dubuisson, V. Giraud, Y. Hu, D. Kratz, V. Noel, C.M.R. Platt, F. Sirou, C. Stubenrauch, A. Lifermann and T. Bret-Dibat</i>	III: 1520 - 1522
TH05_14:40	<b>Synergies of CALIOP with Aqua-Train Instruments</b> <i>Noel, V., Y.X., Hu and M. Chiriaco</i>	III: 1523 - 1525
TH05_15:00	<b>Selection Algorithm for the CALIPSO Lidar Aerosol Extinction-to-Backscatter Ratio</b> <i>Omar, A.H., D.M. Winker, J.-G. Won, M.A. Vaughan, C.A. Hostetler and J.A. Reagan</i>	III: 1526 - 1530
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TH05_15:40	<b>Geoscience Laser Altimeter System (GLAS) on the ICESat Mission: Pre-launch and On-orbit Measurement Performance</b> <i>Abshire, J.B., X. Sun, H. Riris, M. Sirota, J. McGarry, S. Palm, E.A. Ketchum and R.B. Follas</i>	III: 1534 - 1536
TH05_16:00	<b>Atmospheric Measurements by the Geoscience Laser Altimeter System: Initial Results</b> <i>Spinhirne, J., E. Welton, S. Palm, D. Hlavka, W. Hart and A. Mahesh</i>	III: 1537 - 1539
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TH06_16:20	<b>The Two Emergencies of “El Salvador” in the Frame of the International Charter “Space and Major Disasters”</b> <i>Sarti, F., J. Inglada and J.L. Bessis</i>	III: 1543 - 1545
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TH07_14:00	<b>Surface Statistics of the Saharan Ergs Observed in the <math>\sigma^0</math> Azimuth Modulation</b> <i>Stephen, H., and D.G. Long</i>	III: 1549 - 1551
TH07_14:40	<b>A Stabilized Vegetation Index and Several Mineralogic Indices Defined for ASTER VNIR and SWIR Data</b> <i>Ninomiya, Y.</i>	III: 1552 - 1554
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TH08_14:00	<b>Monitoring and Predicting Urban Land Use Change: Applications of Multi-Resolution Multi-Temporal Satellite Data</b> <i>Goetz, S.J., A.J. Smith, C. Jantz, R.K. Wright, S.D. Prince, M.E. Mazzacato and B. Melchior</i>	III: 1567 - 1569
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TH08_15:00	<b>Preliminary Aster and InSAR Imagery Combination for Mud Volcano Dynamics, Azerbaijan</b> <i>Hommels, A., K.H. Scholte, J. Munoz-Sabater, R.F. Hanssen, F.D. Van der Meer, S.B. Kroonenberg, E. Aliyeva, D. Huseynov and I. Guliev</i>	III: 1573 - 1575
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<b>HYPERSPECTRAL APPLICATIONS AND METHODS II</b>		
FR06_08:20	<b>Hyperspectral Endmember Detection and Unmixing Based on Linear Programming</b> <i>Han, T., and D.G. Goodenough</i>	III: 1763 - 1765
FR06_08:40	<b>Regularized Feature Extractions for Hyperspectral Data Classification</b> <i>Kuo, B.-C., L.-W. Ko, C.-H. Pai and D.A. Landgrebe</i>	III: 1767 - 1769
FR06_09:00	<b>Supervised Band Selection for Optimal Use of Data from Airborne Hyperspectral Sensors</b> <i>Riedmann, M., and E.J. Milton</i>	III: 1770 - 1772
FR06_09:20	<b>A Comparative Assessment of Space-Adaptive Analyses of Hyperspectral Imagery</b> <i>Alparone, L., F. Argenti and M. Dionisio</i>	III: 1773 - 1775
FR06_10:40	<b>Semi-Supervised Classification Method for Hyperspectral Remote Sensing Images</b> <i>Gomez-Chova, L., J. Calpe, G. Camps-Valls, J.D. Martin, E. Soria, J. Vila, L. Alonso-Chorda and J. Moreno</i>	III: 1776 - 1778
FR06_11:00	<b>Geologic and Regolith Mapping for Mineral Exploration in the Gawler Craton of South Australia using Hyperion and Other Remote Sensing Techniques</b> <i>Mahoney, S., P. James, A. Mauger and G. Heinson</i>	III: 1779 - 1781
FR06_11:20	<b>Some Problems Relating to Biochemical Concentration Inversion</b> <i>Yan, C., Q. Liu, Z. Niu and C. Wang</i>	III: 1782 - 1784
<b>CLASSIFICATION AND SEGMENTATION I</b>		
FR07_08:20	<b>An Advanced Classification System Based on the Back-Propagation of Consensus</b> <i>Bruzzone, L., and F. Melgani</i>	III: 1785 - 1787
FR07_09:00	<b>Contextual Analysis of Multisource Raster Data by a Region-based Segmentation Tool in a Voronoi Structure</b> <i>Chakroun, H., and G.B. Benie</i>	III: 1788 - 1792
FR07_09:20	<b>Optimal Fusion-Classification of Multisource Remote Sensing Imagery Using Global Optimization and Fuzzy Logic</b> <i>Chitroub, S.</i>	III: 1793 - 1795
FR07_09:40	<b>Adaptive Gaussian Mixture Estimation and Its Application to Unsupervised Classification of Remotely Sensed Images</b> <i>Chakravarty, S., Q. Du and H. Ren</i>	III: 1796 - 1798
FR07_10:20	<b>Multi-resolution Least-squares Spectral Unmixing Algorithm for Subpixel Classification of Hyperspectral Images</b> <i>Barducci, A., A. Mecocci, C. Alamanno, I. Pippi and P. Marcoionni</i>	III: 1799 - 1801
FR07_10:40	<b>Fuzzy Entropy Calculation for SAR Image Classification</b> <i>Angiulli, G., V. Barrile and M. Versaci</i>	III: 1802 - 1804

FR07_11:00	<b>Improved Tree-Structured Segmentation of Remote Sensing Images</b> <i>D'Elia, C., G. Poggi and G. Scarpa</i>	III: 1805 - 1807
FR07_11:20	<b>Statistical Language Models for Topographic Data Recognition</b> <i>Winstanley, A., B. Salaik and L. Keyes</i>	III: 1808 - 1810
FR07_11:40	<b>Scale Selection for Anisotropic Diffusion using Probabilistic Methods</b> <i>Chan, J.C.W., I. Vanhamel and M. Suliga</i>	III: 1811 - 1813
<b>COMPRESSION TECHNIQUES APPLICABLE TO MULTIDIMENSIONAL REMOTE SENSING DATA</b>		
FR08_08:20	<b>Investigation of Wavelets for Raw SAR Data Compression</b> <i>El-Boustani, A., K. Brunham and W. Kinsner</i>	III: 1814 - 1816
FR08_08:40	<b>Spectral Distortion Evaluation in Lossy Compression of Hyperspectral Imagery</b> <i>Aiazzi, B., L. Alparone, S. Baronti, C. Lastris, L. Santurri and M. Selva</i>	III: 1817 - 1819
FR08_09:00	<b>Evaluation and Comparison of JPEG 2000 and Vector Quantization Based Onboard Data Compression Algorithm for Hyperspectral Imagery</b> <i>Qian, S.E., M. Bergeron, C. Serele, I. Cunningham and A. Hollinger</i>	III: 1820 - 1822
FR08_09:20	<b>Versatile Image Data Compression for the BEAGLE 2 Probe</b> <i>Rueffer, P., and A. Borrmann</i>	III: 1823 - 1825
FR08_09:40	<b>Wavelet Packet Remote-Sensing Images Coding Algorithm Based on Quadtree Classification and UTCQ</b> <i>Hou, X., G. Liu and Y.Y. Zou</i>	III: 1826 - 1829
FR08_10:20	<b>A New Approach to Controlling Compression-Induced Distortion of Hyperspectral Images</b> <i>Faulconbridge, R.I., M.R. Pickering, M.J. Ryan and X. Jia</i>	III: 1830 - 1832
FR08_10:40	<b>Adapted Vector-Lifting Schemes for Multiband Textured Image Coding</b> <i>Benazza-Benyahia, A., J.-C. Pesquet and M.H. Gharbia</i>	III: 1833 - 1835
FR08_11:20	<b>Compressing Three-Dimensional GRIB Meteorological Data Using KLT and JPEG 2000</b> <i>Lucero, A., S.D. Cabrera, A. Aguirre and E. Vidal, Jr.</i>	III: 1836 - 1838
FR08_11:40	<b>Video Imagery Transmission and Compression Method Research on Ocean Monitor System</b> <i>Li, M., J. Guo and J. Li</i>	III: 1839 - 1841
<b>ADVANCED LAND OBSERVING SATELLITE</b>		
FR09_09:00	<b>Level 1 Data Processing Algorithm for ALOS PRISM and AVNIR-2</b> <i>Suzuki, S.</i>	III: 1842 - 1844
FR09_09:20	<b>Precision Geolocation Determination and Pointing Management for the Advanced Land Observing Satellite (ALOS)</b> <i>Iwata, T.</i>	III: 1845 - 1848
FR09_10:20	<b>Calibration and Validation of PALSAR (II) - Use of Polarimetric Active Radar Calibrator and the Amazon Rainforest Data</b> <i>Shimada, M., H. Tanaka, T. Tadono and M. Watanabe</i>	III: 1849 - 1850
FR09_10:40	<b>Detection and Monitoring of Unstable High-Mountain Slopes with L-Band SAR Interferometry</b> <i>Strozzi, T., A. Kääb, R. Frauenfelder and U. Wegmüller</i>	III: 1852 - 1854
FR09_11:00	<b>Preliminary Study for Evaluating Geometric Accuracy of ALOS/PRISM</b> <i>Tadono, T., M. Shimada, M. Watanabe, T. Hashimoto and M. Matsuoka</i>	III: 1855 - 1857
FR09_11:20	<b>High Resolution DEM Generation from ALOS PRISM Data - Triplet Image Algorithm Evaluation</b> <i>Takaku, J., N. Futamura, A. Goto, T. Iijima, T. Tadono, M. Matsuoka, M. Shimada and R. Shibasaki</i>	III: 1858 - 1860
FR09_11:40	<b>RPC Model for ALOS/PRISM Images</b> <i>Hashimoto, T.</i>	III: 1861 - 1863
FR09_12:00	<b>Simulations for the Calibration of ALOS/AVNIR-2 using ADEOS/AVNIR</b> <i>Matsuoka, M., M. Shimada, T. Tadono, M. Watanabe and T. Hashimoto</i>	III: 1864 - 1866

## ARID ZONES AND ARCHAEOLOGY

- FR10\_09:20**      **Retrieval of Land Surface Parameters in the Zone of Chotts, Tunisia, from SIR-C/X-SAR Data**  
*Deroin, J.P., V. Bec, M. Zorilla, P.F. Burollet and A. Simonin*      III: 1867 - 1869
- FR10\_09:40**      **A JERS-1 Radar Mosaic for Subsurface Geology Mapping in East Sahara**  
*Paillou, P., and A. Rosenqvist*      III: 1870 - 1872
- FR10\_10:20**      **Validation of Emissivity Estimates from ASTER Data**  
*Schmugge, T., K. Ogawa, F. Jacob, A. French, A. Hsu and J. Ritchie*      III: 1873 - 1875
- FR10\_10:40**      **Time Lag Between Seasonal Change in Precipitation, NDVI and Cereal Prices in Burkina Faso**  
*Tachiiri, K.*      III: 1876 - 1878
- FR10\_11:00**      **Quantitative Estimation of Main Land Cover Patterns in an Arid Environmental Ecosystem Across Israel-Egypt Border Using Remote Sensing Data**  
*Qin, Z., W. Li, A. Karnieli and P. Berliner*      III: 1879 - 1881
- FR10\_11:20**      **A Parametric Approach in Assessment of Soil Degradation Using Remote Sensing and GIS, a Case Study in North Sinai, Egypt**  
*Gad, A.*      III: 1882 - 1884
- FR10\_11:40**      **Exploitation of the Digital Elevation Models in Arid and Semi-arid Areas. Selective Detection of the Topological Shapes using Different Approaches**  
*Miralles-Mellado, I., O. Puertas-Leon, F. Bienvenido and A. Garcia-Lorca*      III: 1885 - 1887

## PART I: MODIS APPLICATIONS

### PART II: FUTURE MISSIONS

- FR11\_09:40**      **Validation of MODIS Albedo Product by Using Field Measurements and Airborne Multi-angular Remote Sensing Observations**  
*Wang, J., Z. Jiao, F. Gao, L. Xie, G. Yan, Y. Xiang, S. Liang and X. Li*      III: 1888 - 1890
- FR11\_10:20**      **Landsat Data Continuity Mission: Creating a Unique Government-Industry Partnership for Global Research**  
*McCouston, J.D., C.D. Wende and J.R. Irons*      III: 1891 - 1893
- FR11\_10:40**      **The Hydrosphere State Mission: An Overview**  
*Entekhabi, D., J. Smith, M. Spencer and R. Girard*      III: 1894 - 1897
- FR11\_11:00**      **Development Status of the Cloud Profiling Radar for the CloudSat Mission**  
*Im, E., S.L. Durden, C. Wu and The CloudSat Radar Team*      III: 1898 - 1900
- FR11\_11:20**      **SnowSat – A Ku-band SAR Mission for Climate Research and Hydrology**  
*Rott, H., B. Grafmueller, A. Thornbury and J.T. Macklin*      III: 1901 - 1903

## OCEAN WAVES AND DYNAMICS

- FR01\_13:40**      **Comparison of Spatial and Spectral Sea State Parameters Measured by Space Borne SAR, Nautical Radar and in Situ Sensors**  
*Borge, J.C.N., H. Dankert, K. Hessner and S. Lehner*      III: 1904 - 1907
- FR01\_14:00**      **Wavenumber Spectra of the Mediterranean Sea Winds Derived from the NASA QuikSCAT Data**  
*Zecchetto, S., and F. De Biasio*      III: 1907 - 1909
- FR01\_14:20**      **Ocean Wave Spectrum and Radar Cross-section Analysis from Coincident ENVISAT ASAR Observations and Airborne Polarimetric Radar Measurements Performed during the VALPARESO Experiment**  
*Hauser, D., A. Mouche, B. Chapron, H. Johnsen, J-F Daloze, C. Guerin, G. Caudal and J.-M. Lefèvre*      III: 1910 - 1914
- FR01\_14:40**      **Use of SAR Cross Spectra for Wind Retrieval from ENVISAT ASAR Wave Mode Data**  
*Schneiderhan, T., J. Schulz-Stellenfleh, S. Lehner, J. Horstmann and D. Hoja*      III: 1915 - 1917
- FR01\_15:00**      **Investigation of Ocean Wave Groups using Radar-Image Sequences**  
*Dankert, H., J.-C. Nieto-Borge and W. Rosenthal*      III: 1918 - 1920

FR01_15:40	<b>A New Wind Sea/Swell Classification Method for Complex ENVISAT ASAR Wave Mode Data</b> <i>Hoja, D., J. Schulz-Stellenfleth and S. Lehner</i>	III: 1921 - 1923
FR01_16:00	<b>Mediterranean Sea Wind and Wave Characteristics from Satellite, Buoy and Numerical Model Data</b> <i>Queffeuou, P., A. Bentamy, T. Lavergne, J.M. Lefèvre and C. Skandrani</i>	III: 1924 - 1926
FR01_16:20	<b>Observations and Modelling of the Response of Along-Track SAR Interferometry to Mesoscale Ocean Features</b> <i>Anderson, C., T. Macklin, J. Wolf, C. Gommenginger and M. Srokosz</i>	III: 1927 - 1929
FR01_17:00	<b>Comparison of RADARSAT-1 SAR Retrieved Wind Fields to Numerical Models</b> <i>Horstmann, J., W. Koch, N. Winstead, F. Monaldo, D. Thompson, P. Clemente-Colón and W. Pichel</i>	III: 1930 - 1932
<b>FOREST BIOMASS MONITORING</b>		
FR02_14:20	<b>Regrowth Biomass Estimation in the Amazon using JERS-1/RADARSAT SAR Composites</b> <i>Pierce, L., P. Liang, M.C. Dobson, J. Kellndorfer, O. Barros, J.R. dos Santos and J. Vianei Soares</i>	III: 1933 - 1935
FR02_14:40	<b>Combined Land-Cover Classification and Stem Volume Estimation Using Multitemporal ERS Tandem INSAR Data</b> <i>Engdahl, M.E., J. Pulliainen and M. Hallikainen</i>	III: 1936 - 1938
FR02_15:00	<b>The Potential of ALOS Single Polarization InSAR for Estimation of Growing Stock Volume in Boreal Forest</b> <i>Eriksson, L.E.B., M. Santoro, C. Schmillius and A. Wiesmann</i>	III: 1939 - 1941
FR02_15:40	<b>Height-Biomass Allometry in Temperate Forests – Performance Accuracy of Height-Biomass Allometry</b> <i>Mette, T., I. Hajnsek and K. Papathanassiou</i>	III: 1942 - 1944
FR02_16:00	<b>Potential of Polarimetric SAR Interferometry for Forest Carbon Accounting</b> <i>Balzter, H., C. Rowland, R. Milne, O. Stebler, G. Patenaude, T. Dawson and P. Saich</i>	III: 1945 - 1947
FR02_16:20	<b>Allometric Equations for Tropical Forest Estimation and Its Relationship with P-band SAR Data</b> <i>Santos, J.R., L.S. Araujo, C.C. Freitas, L.V. Dutra, S.J.S. Sant'Anna, T.M. Kuplich and F.F. Gama</i>	III: 1948 - 1950
<b>TRMM &amp; GPM II</b>		
FR03_13:40	<b>Ground Validation during EGPM: Possible Concepts for an Italian Distributed Site</b> <i>Gorgucci, E., L. Baldini, A. Mugnai and F. Siccardi</i>	III: 1951 - 1953
FR03_14:00	<b>Dual-frequency Rain Profiling Method Without the use of Surface Reference Technique</b> <i>Mardiana, R., T. Iguchi, N. Takahashi and H. Hanado</i>	III: 1954 - 1956
FR03_14:20	<b>Utilization of Range Profile Data of Surface Echo from TRMM/PR</b> <i>Takahashi, N., H. Hanado and T. Iguchi</i>	III: 1957 - 1959
FR03_14:40	<b>Surface Soil Moisture Estimation by TRMM/PR and TMI</b> <i>Seto, S., T. Oki and K. Musiake</i>	III: 1960 - 1962
FR03_15:00	<b>Evaluation of TRMM PR Attenuation by Radar Mirror Image</b> <i>Liao, L., and R. Meneghini</i>	III: 1963 - 1965
FR03_15:40	<b>Challenges and Proposed Solutions for Validation of Spaceborne Rain Rate Estimates</b> <i>Amitai, E., L. Liao, D.B. Wolff, D.A. Marks and D.S. Silberstein</i>	III: 1966 - 1968
<b>URBAN PLANNING AND MANAGEMENT</b>		
FR04_13:40	<b>Modelling Population Pressure in Sub-Urban and Rural Regions Based on Remote Sensing and Statistical Data</b> <i>Steinnocher, K., F.P. Kressler and M. Köstl</i>	III: 1969 - 1971
FR04_14:00	<b>High Resolution Multi-Spectral Analysis of Urban Areas with QuickBird Imagery and Sinergy with ERS Data</b> <i>Schiavon, G., F. Del Frate and C. Solimini</i>	III: 1972 - 1974

FR04_14:40	<b>Extraction of Urban Settlements by an Automatic Approach on High Resolution Remote Sensed Data</b> <i>Tarantino, C., A. D'Addabbo, L. Castellana, G. Pasquariello, P. Blonda and G. Satalino</i>	III: 1975 - 1977
FR04_15:00	<b>Quantitative Analysis of Transportation Network Connectivity with Road Features Automatically Extracted from High-resolution Satellite Imagery</b> <i>Lee, K.</i>	III: 1978 - 1980
FR04_15:40	<b>Research on Urban Spatial Thermal Environment Based on Remote Sensing and GIS</b> <i>Chen, Y., X. Li, J. Li and P. Shi</i>	III: 1981 - 1983
FR04_16:00	<b>Neuro-Textural Classification of Indian Urban Environment</b> <i>Pathak, V., and O. Dikshit</i>	III: 1984 - 1986
FR04_16:20	<b>The Holy City of Mashad, A Changing Environment</b> <i>Zeaiean Firouzabadi, P., and R. Kohkan</i>	III: 1987 - 1989
FR04_17:00	<b>Digital Roof Model (DRM) using High Resolution Satellite Image and Its Application for 3D Mapping of City Region</b> <i>Hashiba, H., K. Kameda, S. Tanaka and T. Sugimura</i>	III: 1990 - 1992
<b>SAR PROCESSING AND STATISTICAL MODELING</b>		
FR05_13:40	<b>A New Model for the Amplitude Statistics of SAR Imagery</b> <i>Eltoft, T.</i>	III: 1993 - 1995
FR05_14:00	<b>A Fisher-MAP filter for SAR Image Processing</b> <i>Nicolas, J.M.</i>	III: 1996 - 1998
FR05_14:20	<b>Accuracy of Fisher Distributions and Log-moment Estimation to Describe Amplitude Distributions of High Resolution SAR Images over Urban Areas</b> <i>Tison, C., J.M. Nicolas and F. Tupin</i>	III: 1999 - 2001
FR05_14:40	<b>Radargrammetric Processing for 3-D Building Extraction from High-Resolution Airborne SAR Data</b> <i>Simonetto, E., H. Oriot, R. Garello and J.-M. Le Caillec</i>	III: 2002 - 2004
FR05_15:00	<b>Target Detection and Analysis Based on Spectral Analysis of a SAR Image: A Simulation Approach</b> <i>Henry, C., J.-C. Souyris and P. Marthon</i>	III: 2005 - 2007
FR05_15:40	<b>Aggregating the Statistical Estimation and Variational Analysis Methods in Radar Imagery</b> <i>Vázquez-Bautista, R.F., Y.V. Shkvarko and L.J. Morales-Mendoza</i>	III: 2008 - 2010
FR05_16:00	<b>Joint Distributions for Correlated Radar Images</b> <i>Storvik, B., G. Storvik and R. Fjørtoft</i>	III: 2011 - 2013
FR05_16:40	<b>Adaptive Spectral Estimation for Multibaseline SAR Tomography with Airborne L-band Data</b> <i>Lombardini, F., and A. Reigber</i>	III: 2014 - 2016
<b>PART I: NEW HYPERSPECTRAL INSTRUMENTS AND TECHNIQUES</b>		
<b>PART II: DATA COMPRESSION</b>		
FR06_13:40	<b>An Initial Analysis of CHRIS-on-board-PROBA Data for the Purposes of Biophysical Parameter Mapping over a Variety of Land Cover Types</b> <i>Thackrah, G., and P. Lewis</i>	III: 2017 - 2019
FR06_14:00	<b>The Airborne Visible/Infrared Imaging Spectrometer AVIS-2 - Multiangular and Hyperspectral Data for Environmental Analysis</b> <i>Mauser, W.</i>	III: 2020 - 2022
FR06_14:40	<b>Spectral Measurements with a New Fourier Transform Imaging Spectrometer (FTIS)</b> <i>Barducci, A., P. Marcoionni and I. Pippi</i>	III: 2023 - 2025
FR06_16:00	<b>Embedded Wavelet-Based Compression of Hyperspectral Imagery Using Tarp Coding</b> <i>Wang, Y., J.T. Rucker and J.E. Fowler</i>	III: 2027 - 2029

FR06_16:40	<b>Wavelet-based Compression of Terrain</b>	<i>Sun, Y., Y.-J. Yang and P. Zhou</i>	III: 2030 - 2032
FR06_17:00	<b>Using JPEG2000 On-Board Mini-Satellites for Image-Driven Compression</b>	<i>Trenschel, T., T. Bretschneider and G. Leedham</i>	III: 2033 - 2035
<b>CLASSIFICATION AND SEGMENTATION II</b>			
FR07_13:40	<b>Remotely Sensed Image Segmentation using an Object Point Process</b>	<i>Drot, S., H. Le Men, X. Descombes and J. Zerubia</i>	III: 2036 - 2038
FR07_14:20	<b>Image Segmentation for the Purpose of Object-Based Classification</b>	<i>Darwish, A., K. Leukert and W. Reinhardt</i>	III: 2039 - 2041
FR07_14:40	<b>Pre-segmentation of High Resolution Images Thanks to the Morphological Pyramid</b>	<i>Laporterie-Déjean, F., E. Lopez-Ornelas and G. Flouzat</i>	III: 2042 - 2044
FR07_15:00	<b>Analysis and Comparison of Functional Dependencies of Multiscale Textural Features on Monospectral Infrared Images</b>	<i>Grazzini, J., H. Yahia, I. Herlin and A. Turiel</i>	III: 2045 - 2047
FR07_16:00	<b>Texture Classification Approach Using Conditional Local Variance Model</b>	<i>Velloso, M.L.F., F.J. de Souza and N.N. Almeida</i>	III: 2048 - 2050
FR07_16:20	<b>Optimality of Decision Boundary Feature Extraction for Multiclass Problems</b>	<i>Choe, J., and C. Lee</i>	III: 2051 - 2053
FR07_16:40	<b>Support Vector Machines in Multisource Classification</b>	<i>Halldorsson, G.H., J.A. Benediktsson and J.R. Sveinsson</i>	III: 2054 - 2056
FR07_17:00	<b>A Fast Implementation of the ISOCLUS Algorithm</b>	<i>Memarsadeghi, N., D.M. Mount, N.S. Netanyahu and J. Le Moigne</i>	III: 2057 - 2059
<b>INFORMATION PROCESSING AND EXTRACTION</b>			
FR08_13:40	<b>A New Vegetation Index and Its Principle and Application</b>	<i>Tang, S., Q. Zhu, Y. Shuai, D. Xie and G. Zhou</i>	III: 2060 - 2062
FR08_14:00	<b>A Generic Procedure for BRDF Normalization of Remotely Sensed Data</b>	<i>Yuan, D., and E.L. Doak</i>	III: 2063 - 2065
FR08_14:20	<b>Comparison of Standard, Radio-sounded and Forecasted Atmospheric Data in a Solar Spectrum Atmospheric Correction System</b>	<i>Martínez, L., V. Palà and R. Arbiol</i>	III: 2066 - 2068
FR08_14:40	<b>Atmospheric Correction for AMTIS Single-channel Multi-angular Thermal-infrared Imagery</b>	<i>He, L., G. Yan, H. Wang, X. Li and J. Wang</i>	III: 2069 - 2071
FR08_15:00	<b>Sources of Uncertainty in Vicarious Calibration: Understanding Calibration Target Reflectance</b>	<i>Anderson, K., E.J. Milton and E.M. Rollin</i>	III: 2072 - 2074
FR08_15:40	<b>Hyperspectral Image Simulator to Support SPECTRA Mission System Study</b>	<i>Houzelle, S., D. Lebedeff, F. Olivier, J.Y. Labandibar and L. Moreau</i>	III: 2075 - 2077
FR08_16:00	<b>Retrieval of Atmospheric Temperature and Moisture Profiles from Hyperspectral Sounding Data using a Projected Principal Components Transform and a Neural Network</b>	<i>Blackwell, W.J.</i>	III: 2078 - 2080
FR08_16:20	<b>The Combined Effect of Spatial Resolution and Measurement Uncertainty on the Accuracy of Empirical Atmospheric Correction</b>	<i>Hamm, N., P.M. Atkinson and E.J. Milton</i>	III: 2082 - 2084
FR08_16:40	<b>Use of Image Regularity Constraints for Inverse Modelling of Solar Irradiation</b>	<i>Herlin, I., J.-P. Berroir and T. De Smit</i>	III: 2085 - 2087

**PART I: ENVIRONMENTAL DEGRADATION AND POLLUTION**

**PART II: STABLE POINTS INTERFEROMETRY**

- FR09\_13:40 Remote Sensing and Spatial Decision Support System for Environmental Degradation Monitoring**  
*Simões, M., A.P.C. Gilson, D. Singh, L.C.C. Heitor, E. Fraga, J.P. Berroir, K.P. Singh, I. Herlin, H.V. Vieira and U.P. Santos* III: 2088 - 2090
- FR09\_14:00 Change of Eco-environment in Source Region of Yangtze River and Yellow River from Landsat Observations**  
*Wang, J., J. Pan and W. Li* III: 2091 - 2093
- FR09\_14:20 Environmental Impact Assessment of a Barrage System Using Novel Change Detection Methods**  
*Kristof, D., and D. Ducrot* III: 2094 - 2096
- FR09\_14:40 Monitoring of Temperature Regime in Area of Semipalatinsk Nuclear Test Site**  
*Sultangazin, U.M., E.A. Zakarin, L.F. Spivak, O.P. Arkhipkin and L.A. Balakay* III: 2097 - 2099
- FR09\_15:00 Generating High Spatial Resolution Analyses of SBUV Stratospheric Ozone for Calculating the Tropospheric Ozone Residual (TOR)**  
*Christakos, G., A. Kolovos, M.L. Serre and M. Vukovich* III: 2100 - 2102
- FR09\_15:40 Discrimination of Different Sources of Signals in Permanent Scatterers Technique by Means of Independent Component Analysis**  
*Bovenga, F., S. Stramaglia, R. Nutricato and A. Refice* III: 2103 - 2105
- FR09\_16:00 Measurement of Sea Level by L-band SAR**  
*Kim, S.-W., and J.-S. Won* III: 2106 - 2108
- FR09\_16:20 Microstrip Permanent Scatterers for SAR Interferometry Applications**  
*Costanzo, S., F. Venneri, G. Di Massa and G. Angiulli* III: 2109 - 2111
- FR09\_16:40 Physical Analysis of Atmospheric Delay Signal Observed in Stacked Radar Interferometric Data**  
*Muñoz Sabater, J., R. Hanssen, B.M. Kampes, A. Fusco and N. Adam* III: 2112 - 2115

**COASTAL ENVIRONMENT**

- FR10\_14:20 Tidal Flat DEM Generation by Satellite Remote Sensing**  
*Won, J.-S., Y.-H. Na and S.-W. Kim* III: 2116 - 2118
- FR10\_14:40 Satellite Monitoring of the Caspian Sea Coastal Zone Response to the Sea Level Fluctuations: A Case of Kalmykian Coast**  
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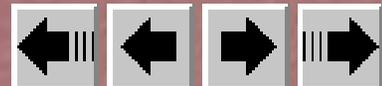
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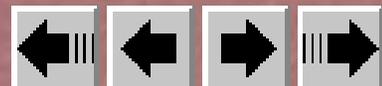
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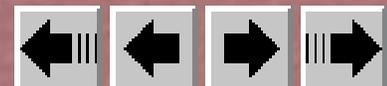
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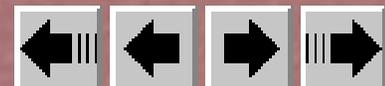
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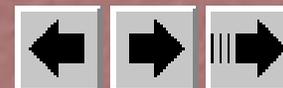
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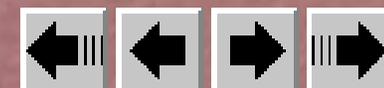
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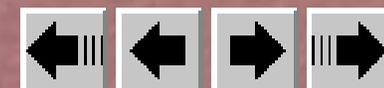
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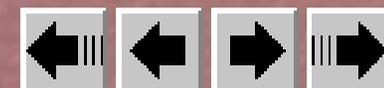
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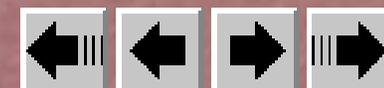
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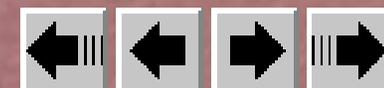
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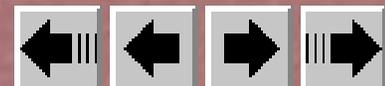
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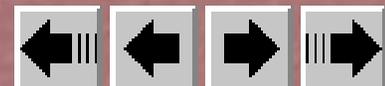
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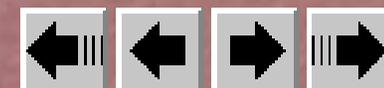
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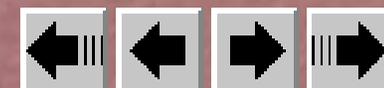
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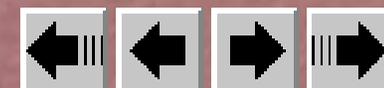
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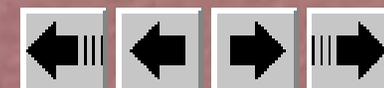
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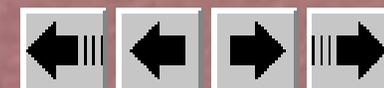
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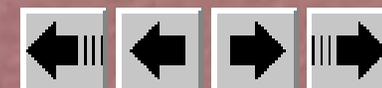
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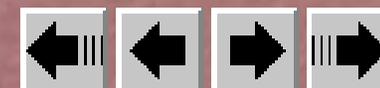
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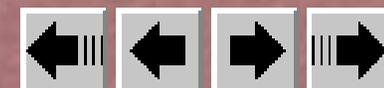
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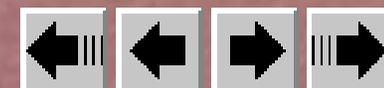
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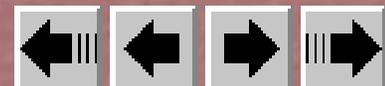
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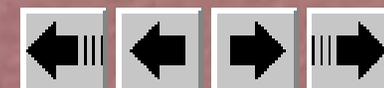
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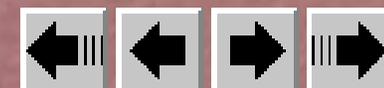
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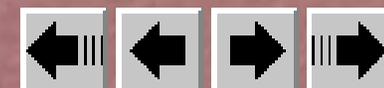
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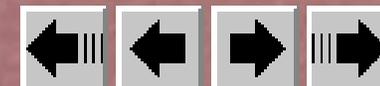
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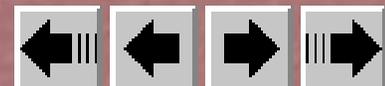
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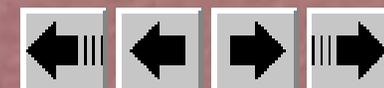
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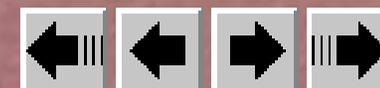
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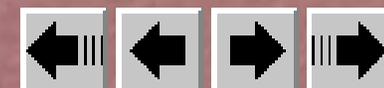
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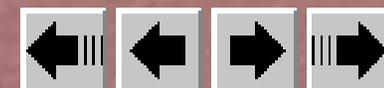
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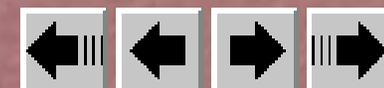
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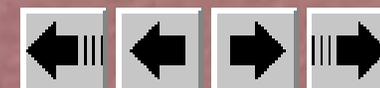
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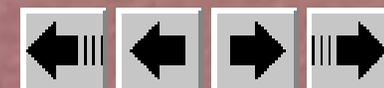
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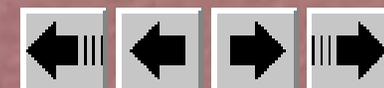
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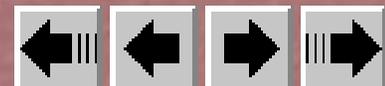
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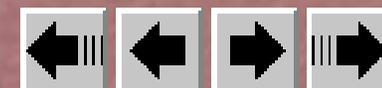
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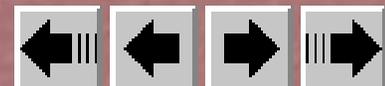
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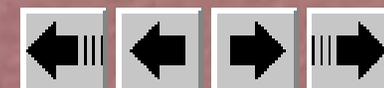
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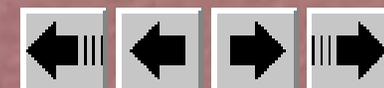
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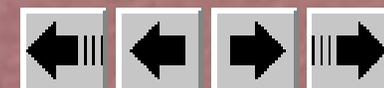
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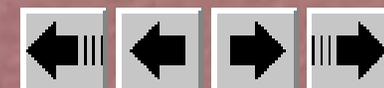
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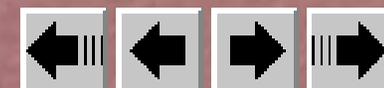
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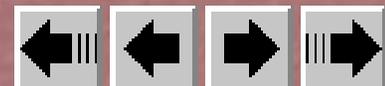
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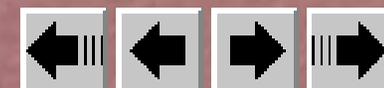
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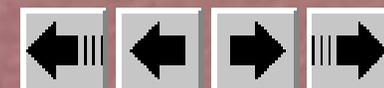
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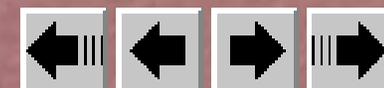
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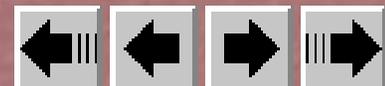
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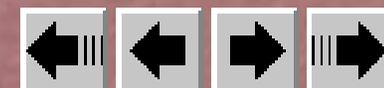
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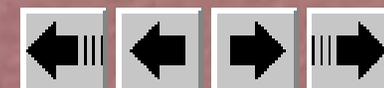
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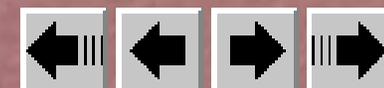
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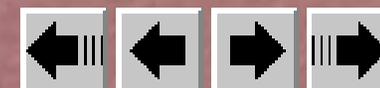
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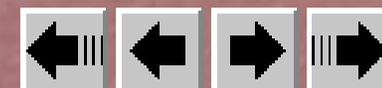
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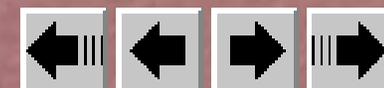
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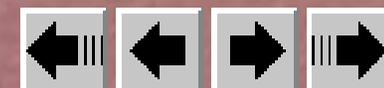
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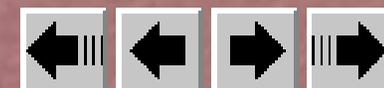
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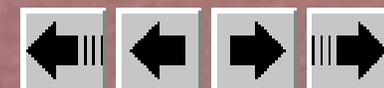
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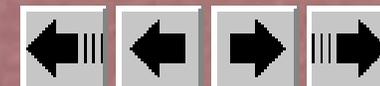
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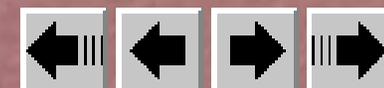
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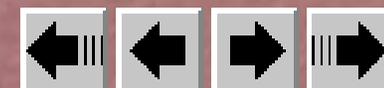
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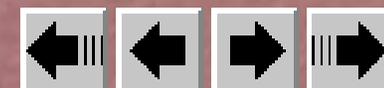
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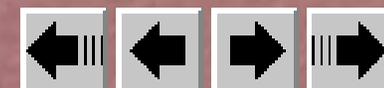
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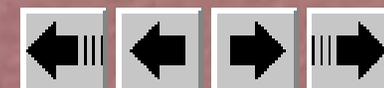
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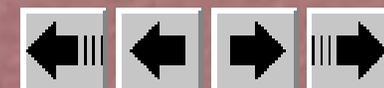
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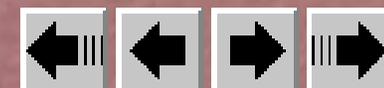
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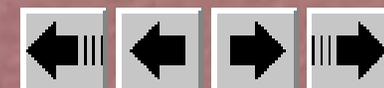
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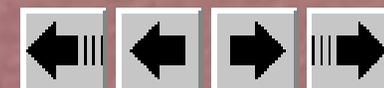
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