Norsk Regnesentral
NORWEGIAN COMPUTING CENTER

Note

Minor Improvements in Channels

Note no SAND/01/08

Authors Frode Georgsen, Arne Skorstad

Date January 2008

Norsk Regnesentral

Norsk Regnesentral (Norwegian Computing Center, NR) is a private, independent, non-profit foundation established in 1952. NR carries out contract research and development projects in the areas of information and communication technology and applied statistical modeling. The clients are a broad range of industrial, commercial and public service organizations in the national as well as the international market. Our scientific and technical capabilities are further developed in co-operation with The Research Council of Norway and key customers. The results of our projects may take the form of reports, software, prototypes, and short courses. A proof of the confidence and appreciation our clients have for us is given by the fact that most of our new contracts are signed with previous customers.

Roxar

Roxar is a leading international provider of products and associated services for reservoir management and production optimization.

Roxar has signed a three-year agreement with Norsk Regnesentral to further develop stochastic reservoir modelling, reduce uncertainty and maximize reservoir performance.

Roxar is a leading technology solutions provider to the upstream oil and gas industry.

With this agreement, NR will use Roxar as an exclusive commercialization partner for reservoir modelling software and, in return, Roxar will commit to a certain volume of purchased research projects.

Roxar and NR have cooperated on developing the modelling software Irap RMS for many years. NR has been responsible for development of all methods and algorithms currently used for 3D property modelling in Irap RMS.

Norsk Regnesentral
Norwegian Computing Center
Postboks 114, Blindern
NO-0314 Oslo, Norway

Besøksadresse
Office address
Gaustadalléen 23
NO-0373 Oslo, Norway

Telefon · telephone
(+47) 22 85 25 00
Telefaks · telefax
(+47) 22 69 76 60

Internett · internet
www.nr.no
E-post · e-mail
nr@nr.no

Title	**Minor Improvements in Facies:Channels**
Authors	**Frode Georgsen, Arne Skorstad**
Date	January
Year	2008
Publication number	SAND/01/08

Abstract

A summary is given on some developments and improvements in Facies:Channels.

Keywords	Object modeling, Stochastic simulation
Target group	Users of Channels module in Irap RMS
Availability	Open
Project number	643005
Research field	Stochastic reservoir characterization
Number of pages	8

Contents

1 Introduction

This note describes three minor changes done in the Facies:Channels module in Irap RMS. These are related to (i) Truncation of width and thickness distribution, (ii) Correlation between expected thickness and expected width for conditioning channels and (iii) Statistics table from log file.

2 Truncation of width and thickness distribution

In the RMS – panel the user has the possibility to truncate the distribution for the expected width and thickness by specifying a minimum and/or a maximum value. This is done in the Facies:Modelling->Facies:Channels->Geometry panel. Figure 1 shows how the parameters for the distribution are set.

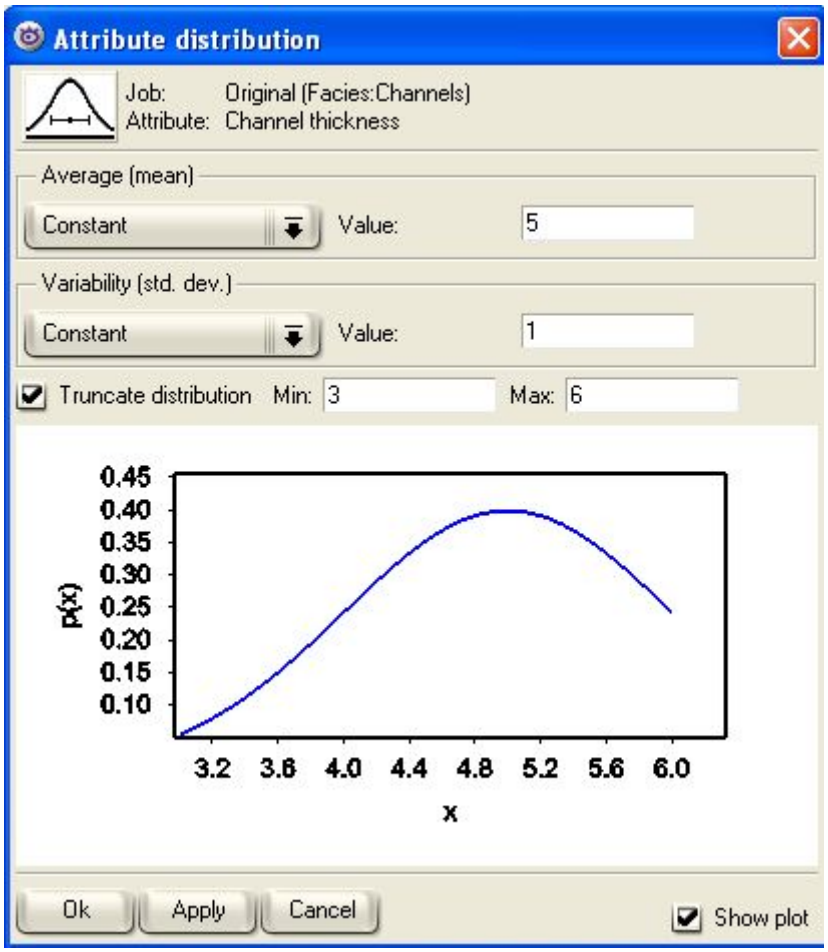

Figure 1: The RMS panel used to set parameter in truncated distribution for channel thickness.

The truncation values are interpreted such that the mean width or thickness can not exceed the limits, but up till now these limits have also been used to truncate the channel width and thickness at every point in the local grid along the main axis of the channel. The new implementation implies that the width and thickness of the channel are allowed to locally exceed the truncation values

and are only limited by the default values (0.01 and 90 % of the maximum double number).

3 Correlation between expected thickness and expected width for conditioning channels

Inspection on simulated realizations has revealed that there is a difference in how the conditioned and the unconditioned channels handle the correlation between expected thickness and width. This is due to an error in how the expected width and thickness are drawn for observed channels. The necessary corrections in the functions that calculate the posterior distribution for these variables are implemented. This ensures that the correct posterior correlation coefficient is honoured. Note that this number will generally not be equal to the prior correlation coefficient.

4 Statistics table from log file

In order to improve the data analysis of the realizations from Facies:Channels, new output is printed in a statistics table. Each line of the file contains information of one body in the following format:

```
Body#  Mean[HW]  Mean[VT]  Azimuth     Dip  #ChnObs  #CrevObs  #ErodObs  Observations
    1    771.55      7.34   -52.82   -0.01        0         0         0
    2    629.76      4.66   -97.42   -0.06        1         0         1  (W_8 6 1) E:(W_5 6 1)

    …
```

`Body#` relates to the number the body is given in RMS. `Mean[HW]`and `Mean[VT]`are the drawn values for expected width and thickness of the channel. `Azimuth` and Dip are angles specified in degrees. `#ChnObs` and `#CrevObs` are the numbers of channel and crevasse observations that the channel are conditioned on, while `#ErodObs` is the number of observations that the channel goes through, but does not condition. This means that these observations condition other channels that erode this channel. `Observations` gives the id (wellname family channel) for the observations that the channel goes through in the order: channelobs crevobs erodedobs

The file name for the statistics file with the new output is specified in the model file for fluvial_facies under the command name RESULT with the key-word [stat-file(string)]. The filename must be a string with no blanks or commas and the default value is <modelname>.stat The format is shown in the following example:

```
RESULT
[result-file(string)]  zone001/facies/test.fett
[log-file(string)]     zone001/facies/test.log
[stat-file(string)]    zone001/facies/test.stat
;
```