GeoModeller Stochastic Exploration

Padding Issues

… and some *rules of thumb* re Project size

GeoModeller Stochastic Exploration
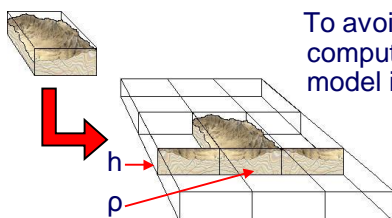
Gravity Data Preparation 4

Gravity grid

Voxelised 3D geological model

Gravity grid cells exactly matched to the voxel model

GeoModeller Stochastic Exploration
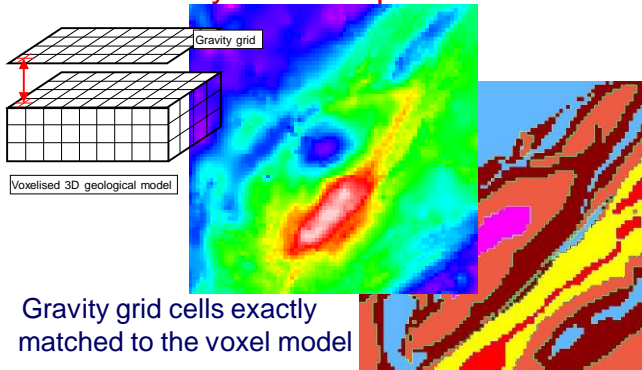
Edge Effects ? … Padding

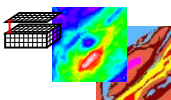**GeoModeller Stochastic Exploration**
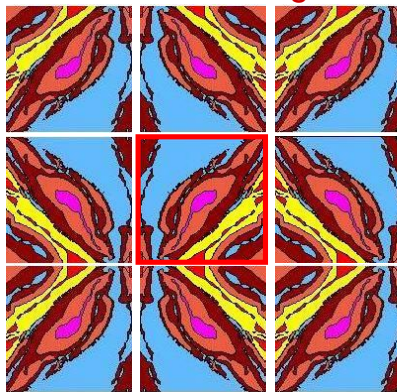
Gravity Data Preparation: DC Level?

To avoid edge effects in the computed gravity, a larger model is used … ~ a 'slab'

h

ρ

The *level* of the computed gravity will be ~ 2πρGh
… so the measured data should ~ match that level.

GeoModeller Stochastic Exploration

Padding

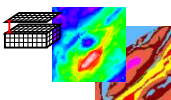- Is 'turned on' with a CaseControl command: 'IncludeBorderEffect'

```
rem IncludeBorderEffect: 1=use model padding to remove 'edge effects'; 0=no padding
call %DoTask% %CaseXML% CaseControl IncludeBorderEffect 1
```
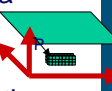
3D GeoModeller

GeoModeller Stochastic Exploration

Padding

- With padding, the same grid cells are computed, but …
- … there are *8x as many voxels* for which a 'response' must be computed – achieved using a revised response kernel (voxel)
- In inversion, at each iteration a change to the geology and/or the properties is proposed. The *same change* is also made in the corresponding voxels within the 'reflected' padding zone around the perimeter

3D GeoModeller

GeoModeller Stochastic Exploration
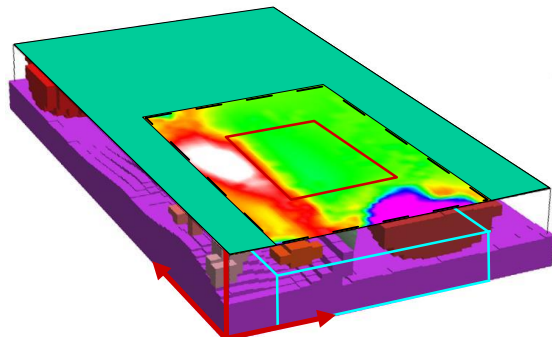
Recommended Alternative – Bigger Model

- Padding is quick and simple – and it does remove edge effects. But the geology within the padded zone is 'approximate' … which will be quite wrong in some instances
- A recommended alternative …
  - Build a larger geology model – say, three times larger than you area-of-interest
  - Then compute the geophysical solution for a larger project area (larger than your primary area-of-interest). Compute this *without* padding! Then clip the grid back to your area-of-interest – thus trimming off the edge-effects
  - You can do this even if you don't 'know' the perimeter geology very well … at least you are 'in control' of the geology within your effective 'padded zone'

3D GeoModeller

GeoModeller Stochastic Exploration

Recommended Alternative – Bigger Model

3D GeoModeller

GeoModeller Stochastic Exploration

How Big to Make My Model?

- There are some 'rules-of-thumb that you can apply to guide your choice of 'project size' …
  - build a project where the region of interest is approx. *one quarter* of the linear dimension
    - e.g. for a 20x20x5 km region of interest, build a 100x100x20km project
  - If I am interested in a geological feature which extends to some depth 'D' my region-of-interest should extend at least a distance D beyond the limits of the boundaries of the geological body

3D GeoModeller