Creation of geological landforms

The compilation of geological landforms uses landscape features developed from a Digital Elevation Model (DEM). This output is combined with a geological coverage of the entire catchment using 1:100 000 scale information to assemble geological landforms. The process involves:

- Generating the DEM from 1:25 000 topography and stream network data using Anudem version 4.6.1. This uses contour information, point information and hydrology in digital format to create an elevation grid. The DEM in grid format has a cell size of 20 x 20 m.

- Developing a relief grid. In ArcGrid, the focal range command is used to develop a relief grid based upon elevation differentiation over a radius of 300 m from the DEM. Given that the cell size from the digital elevation model is 20 x 20 m, the radius is 15 cells (15 x 20 m = 300 m).

  i.e. FOCALRANGE(<grid>, <CIRCLE>, <radius>, {DATA | NODATA})

  In this case: FOCALRANGE(elevation, CIRCLE, 15, DATA)

- Assembling the relief classes as identified in the 'Australian Soil and Land Survey Field Handbook' (McDonald *et al.* 1990). Grid cells are reclassified into five categories.

Relief category	*Classification*
Mountains	Very high (>300 metres)
Hills	High (90-300 metres)
Low Hills	Low (30-90 metres)
Rises	Very low (9-30 metres)
Plain	Extremely low (<9 metres)

- Assembling the slope classes as identified in the 'Australian Soil and Land Survey Field Handbook' (McDonald *et al.* 1990). Grid cells are reclassified into eight categories.

Slope Category	*Classification*	*Slope Class*
Level	<1%	Level
Very gentle	1-3%	Gently undulating
Gentle	3-10%	Undulating
Moderate	10-20%	Rolling
Moderately steep	20-32%	Moderately steep
Steep	32-56%	Steep
Very steep	56-100%	Very steep
Precipitous	>100%	Precipitous

- Developing erosional landform units. This involves combining the relief and the slope categories, thus giving rise to landforms such as gently undulating plains and rolling rises.

Baxter & Robinson (2001). A Land Resource Assessment of the Glenelg Hopkins region. Agriculture Victoria – CLPR.

- Compiling geology coverage from the 1:100 000 digital information. Unfortunately with these 1:100 000 maps, there may be map boundary discrepancies and differing scales of map detail. These map boundaries and discrepancies in geology are to be accounted for and corrected to produce a consistent and accurate coverage through editing in ArcEdit. Gaps in the coverage are filled via the extrapolation process.

- Assigning geological units into lithological groups with an emphasis on texture, formation type and age (for the Glenelg Hopkins region, 58 geological lithology types were recognised for the catchment). Convert this coverage into a grid with the same cell size as the DEM.

- Developing soil/landform map units. This involves combining the lithology of these geological units, and addition of the erosional landform.

- Using ArcView, erosional landforms and lithological types are combined producing a composite grid of geological (lithology) landforms.

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