DEVELOPING REGIONAL-SCALE HYDROGEOLOGICAL FRAMEWORKS FOR REMOTE PARTS OF AUSTRALIA – THE ROLE OF DIGITAL TERRAIN DATA COUPLED WITH FINE-SCALE GEOPHYSICAL AND GEOLOGICAL DATA

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Securing water resources in central Australia for isolated communities and environment is a challenge for both State Governments and industry. The G-FLOWS projects of the Goyder Institute for Water have developed a scalable approach to help better understand water resources of arid inland regions of Australia. It employs digital terrain data and a terrain index - MrVBF to delimit contemporary valleys or low points in the landscape. This index is designed to identify areas where alluvial/colluvial material might be deposited at a range of scales based on the observations that valley bottoms are low and flat relative to their surroundings and that large valley bottoms are flatter than smaller ones. This index has been tested with airborne electromagnetic and airborne magnetics data datasets in data poor, arid parts of South Australia where spatial associations between surface topography and materials, and observed subsurface character were identified. A hydrogeological framework model was then developed with five hydrogeological units defined, categorising the landscape as comprising alluvial aquifers with buried palaeovalley systems, alluvial/colluvial aquifers, colluvial aquifers, aquifers in saprolite and weathered fractured rock, and fractured rock aquifers in fresh rocks. The hydrogeological framework model has also been tested in other areas, and can be scaled depending on the resolution of available terrain data, but also an understanding of the basement geology. The framework can help target locations and determine approaches for finer-scale groundwater resource assessments by Government or industry, and in future can be modified and applied to other areas in Australia as needed.