

Drainage Network Analysis and the Evolution of Sediment Supply to the Black Sea

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Reservoir presence and continuity represents a major exploration risk in many part of the Black Sea Basin. At the exploration scale the reduction of this risk requires a method of improving the understanding of the full source to sink sediment distribution system. Whilst many studies focus exclusively on the depositional basin, sediment flux is controlled by a wide combination of factors that exert an influence far beyond the physical limits of the depositional basin. These include global climatic factors and the geological evolution of the entire hinterland region, from where the sediment was ultimately derived.

A detailed study of the hinterland to the Black Sea Basin has been completed by Fugro Robertson. A key part of this analysis was a detailed study of the present day drainage networks to identify features that relate to the long term (geological) evolution of the drainage systems. Network analysis from blue line (cartographically mapped) drainage systems was undertaken in parallel with a processing of digital elevation data and an auto-extracted network. The results of the network analysis were further integrated with a broader palaeogeomorphic study and with a review of the palaeogeographic and tectonic evolution of the greater Black Sea region.

The results of this study are a significantly improved understanding of sediment supply to the northern and eastern margin of the Black Sea, including the location of candidate input points and a qualitative assessment of the flux in both volume and quality of the sediment load delivered to the depositional basin. Key examples of both the methodology and results will be illustrated and the value of integrating information from depositional basins with a broader understanding of the total sediment supply system demonstrated.