Numeric model calibration against both flux and head targets to determine reliable groundwater inflow predictions

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Abstract Kinsenda Mine is a defunct underground copper mine in the Democratic Republic of the Congo which will be re-opened with the additional development of new underground mining areas. Groundwater inflows were a large problem while the mine was operational in the past. Management of groundwater inflows formed an integral part of the new mine design and scheduling to reduce production losses caused by the inflows and to ensure a safe mining environment.

The mine is located is a complex hydrogeological setting characterised by folding and faulting. Multiple fractured aquifers are associated with the mining area. Geological and hydrogeological data on a regional scale was scare resulting in certain assumptions been made. Groundwater numerical modelling was used as a management tool to aid in the new mine design and dewatering management. The numerical model was calibrated by using measured data collected from the old mine.

Numerical simulations assisted in estimating average groundwater inflows at certain stages of the proposed mine development. The simulated mine groundwater inflow volumes were used as input into the design and scheduling of the dewatering measures to ensure a safe mining environment.

Keywords dewatering, calibration, flux and head targets, groundwater inflow