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THE CONNECTIONS BETWEEN HYDROGEOLOGICAL AND HYDROLOGICAL MODELLING AND WETLAND VEGETATION MONITORING IN MINING AREAS REVEALED BY MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

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Successful modelling relies on a comprehensive data set. In mining areas, integrating data on groundwater and surface water level fluctuations, wetland vegetation retention capacity and hydrogeological modelling provides a robust collection of interrelated information for specific locations on the Earth's surface. Effective hydrogeological modelling is essential and should consider both pre-mining conditions and environmental changes unrelated to mining activities. Systematic, long-term monitoring of groundwater and surface water levels at key hydrological points in and around the mine site is critical. In addition, wetland vegetation retention parameters can be monitored in real time, while historical changes can be analysed using historical aerial photographs. This analysis can highlight shifts in the coverage of key wetland vegetation types. The comprehensive data collected from selected monitoring points in the mining-affected area provides a strong basis for modelling hydrological conditions and understanding valuable hydrological processes, facilitating the development of scenarios and predictions.