

## **Possible mine dewatering impacts on a Philippine community's groundwater supply: Insight from Analytic Element Method**

Jayson Gabriel Pinza

Advocates of Science and Technology for the People (AGHAM), Quezon City, Philippines

### **Abstract**

In the 2010s, the community close to a mine in Luzon Island, Philippines, observed substantial lowering of groundwater levels (GL). This had coincided with the mine development, raising concerns on the mine dewatering possibly contributing to this GL decline. Thus, I demonstrated this possibility by examining this dewatering impact on GLs within community area in my groundwater model based on the analytic element method. No long-term GL monitoring data prior to and after the mine development has been accessible, so this model cannot be calibrated. But, it is still useful to at least see if the model shows extensive GL lowering by using the model parameter values and soft data mostly from the mining company's technical reports.

The following model features are considered: my analytic line elements representing the shear zone, rivers, and the boundary conditions (no-flow and leaky types); my main hydrostratigraphic unit being the fractured hard rock (confined type); the climate type being Type IV, justifying the recharge (10% of annual rainfall) being equally distributed yearly; hydraulic conductivity ranges for both geologic shear zone and hard rock; the clayey gravel texture of the riverbed, and; pumping rates for open pit (OP: 150 L/s) and underground activities (UG: 350 L/s). For conditions related to inflows and outflows, I first considered the reported ones that will make simulation scenarios the most conservative possible (e.g., highest annual rainfall, putting the dewatering system's location as far from the community as possible, etc.).

Results show that OP and UG significantly lowered GLs by 5 and 10 meters for at least half of the community proximal to the mine, respectively. Hence, even the most conservative scenarios reflect the dewatering's significant impact to the community's water supply. Increasing the dewatering rates (as done and projected by the company) could have thus likely exacerbated this crisis.

### **Choose Category**

Paper Proposals