

How pumping relates to groundwater levels?

Unlocking a unique piezometric archive in Cambodia

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CONTEXT

In Cambodia, historical groundwater level records are nearly absent in most aquifers. In the upper Mekong delta, groundwater exploitation has grown steadily over thirty years for domestic and irrigation purposes. Within the district of Me Sang, a non-specialist has spent two decades measuring groundwater levels in several dozen villages. His aim was to draw attention to the correlation between the intensity of pumping and the fall in the water table.

This direct correlation is often highlighted in the field of water management. Unfortunately, groundwater extraction is not the only factor affecting the water table; the hydrodynamic properties of the aquifer also play an important role.

The field notes, written in Khmer, have been digitised and entered into a digital database: an unexpected and rare record of the onset of intensive aquifer exploitation. This long local time series therefore provides an excellent opportunity to demonstrate the extent to which pumping can actually influence groundwater levels.



SCIENTIFIC OBJECTIVES

- **Critique and normalisation:** assess quality and representativeness of the archive; reconcile measurements taken using hand-made probes with parallel instrumental data
- **Mapping:** produce groundwater level contour maps over the full monitoring period and seasonal LU/LC maps
- **Analysis:** characterise the spatial and temporal variation in groundwater levels, and relate these to the intensity of pumping and the hydrodynamic properties of the aquifer

THE MISSION

Based on the digitalized notebook data:

- Untangle and structure the dataset (irregular, incomplete, uncertain records)
- Cross-check against contemporary instrumental measurements to validate and correct the archive
- Produce piezometric maps and groundwater level time-series
- Analyse satellite images to produce LU/LC maps
- Characterize spatial and temporal dynamics
- Assess the effect of pumping on groundwater levels based on different assumptions regarding the hydrodynamic properties of the aquifer (using numerical modelling tools)

THE RESEARCH UNIT: G-EAU

- G-EAU is an interdisciplinary research unit located in the North of Montpellier at the Agropolis campus
- It unites both social and natural scientists interested in the study of water – from hydrogeologists and remote sensing experts to human geographers and sociohydrologists
- Students will be able to integrate themselves into a rich and welcoming environment of scientific diversity. Weekly events include the Friday discovery seminar series (Vendredi Découverte), and the communal coffee social every Tuesday.

