Revitalizing Nile Abandoned Side Channels: Dynamics and Goals. (Oral)

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ABSTRACT

Over time, many side channels of the Nile have shifted from being lively lateral pathways to mostly cut-off or only seasonally active abandoned side channels. That means they do not deliver as much sediment, cannot handle floods as well, and are not as connected ecologically as they used to be. This study zooms in on how some of these abandoned side channels behave, especially after targeted revitalization efforts, with the big goal of guiding smarter, science-backed planning for bringing them back to life, right when Egypt is rethinking its water strategies.

We kicked things off with fieldwork, mapping the landscape, and digging into geospatial data. Using a two-dimensional morphological model, we ran simulations to see how water moves, how sediment travels, and how the side channels link up with one another under various flow conditions and revitalization scenarios. To piece together how these side channels changed over the years and pinpoint bottlenecks that stop water from getting into them now, we combined old topographic maps, recent satellite images, and modern Digital Elevation Models. Then we fine-tuned the model with real field data, so it would actually reflect how these river side channels respond to intervention.

For a closer look, we focused on two side channels, Khor Al-Qanawiya and Khor Al-Kaiman. In Khor Al-Qanawiya, the team went for controlled dredging both in the main channel and upstream. That bumped up the flow ratio by about 3.5% (~25 m^3/s) and made the side channel more active when rivers were moderate to high. Khor Al-Kaiman is a bit more complex, splitting into two connected khors. We tested three setups: just the main khor, the main khor plus the second khor sliced into three segments, and the whole system together with its upstream area. Depending on which geometry we pushed, those changes boosted flow ratios anywhere from 2% to 15% (~40 to 300 m^3/s).

What stands out is how even small tweaks, like selective dredging, removing blockages, or adjusting structures, made these abandoned side channels carry more water, distribute sediment better, and improve ecological health. The analysis also flags specific stretches where these low-key interventions have the biggest effect.

Connecting all this to Egypt's broader strategies for water and ecosystem management, the study lays out a practical roadmap for merging side-channels revitalization into river-basin planning. More room for the river, ecosystems stay healthier, and people gain, through more recreation options and smarter land use during floods.

Keywords: Nile River; side channels; hydro-morphological modelling; river revitalization; sediment transport.