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How geomorphology can shape policy - Advances in system understanding of the Mekong delta reveal large anthropogenic impacts and drive policy change

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Deltas have been a focal point for geomorphologists for decades, as these geologically young and transient landforms are formed and influenced by the **interplay** of many Earth surface processes. Hence delta systems are highly dynamic with sophisticated couplings and feedbacks that often span across multiple **scientific domains**. **Climate change** (including sea-level rise) and upstream damming alter the boundary conditions that determine how deltas form, grow, or shrink, however, the **impact of human pressures** within the delta system is becoming increasingly dominant in **driving environmental change**. Rapid economic development and urbanization of the world deltas often lead to overexploitation and exhaustion of natural resources, such as fresh water and sand. The impacts of such **human-induced overexploitations** have recently been shown to be dominant in driving the current geomorphological changes witnessed in the Mekong delta. The overexploitation of fresh **groundwater** is caused wide-spread decrease in groundwater levels in the aquifer-system, which leads to **accelerated rates of land subsidence and salinization of fresh groundwater resources**. The extraction of **riverbed sand** and upstream impoundments deepen the river channels which changes the fluvial and tidal dynamics leading to **increased riverbank erosion and surface water salinization**.

Recent **advances in geomorphological system understanding** of the Mekong delta have revealed its critical state and show its disastrous trajectory towards which it is going when current business-as-usual practices are continued in the next decades. The scientific findings from several research groups have been instrumental to the quick increase in awareness and sense of urgency within governmental bodies and has laid the foundation for the development of more **system-inclusive delta policy**. Although the road towards effective mitigation of the root causes is still long, multi-disciplinary geomorphological research was effective in quantifying gradual but crucial human-induced changes in the delta system. This talk highlights some of the **key scientific findings** in the Mekong delta and elaborates on how science was instrumental to make the issues visible to a larger community of stakeholders and policymakers.