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Unravelling and quantifying natural and anthropogenic subsidence drivers in a mega delta

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Unraveling the contribution of different natural and anthropogenic drivers to total subsidence can be a main challenge when studying changes of land elevation in a coastal-deltaic area. In fact, the contribution of a single driver often varies both in time and space and segmented land subsidence measurements only provide part of the solution. However, it is a crucial step required to facilitate the development of effective mitigation and adaptation strategies for sinking coastal-deltaic areas. This presentation highlights recent and future advances towards unravelling the contribution of different subsidence drivers for one of the largest deltas on the planet, the Mekong delta.

The multidisciplinary approach combined estimates of subsidence rates, both remotely-sensed (PS INSAR) and from field observations, with spatial data analysis and two complementary numerical modelling approaches, which bring together information and expertise from amongst others geology, hydrogeology and geomechanics. This multi-year effort provides insights in several significant natural (i.e. natural compaction) and anthropogenic subsidence (i.e. aquifer systems compaction due to groundwater extraction) processes that play a role in the Mekong delta system. Combining various advances enabled the creation of future elevation projections following groundwater-extraction scenarios, which provides valuable insights for Mekong delta's policymakers but also shows the dire situation of the low-lying delta. Efforts towards further unraveling and quantification different subsidence drivers in the Mekong delta are ongoing and new Sentinel's PS INSAR data provide exciting opportunities for detailed quantification of depth-dependent sinking rates.

Present results make clear that the effectiveness of mitigation measures to reduce groundwater extraction-induced sinking rates will predominantly determine elevation evolution and thereby faith of the low-lying Mekong delta in the coming decades.