



From Natural to Design River Deltas

Liviu Giosan

Woods Hole Oceanographic Institution, Geology&Geophysics, Woods Hole, United States (lgiosan@whoi.edu)

Productive and biologically diverse, deltaic lowlands attracted humans since prehistory and may have spurred the emergence of the first urban civilizations. Deltas continued to be an important nexus for economic development across the world and are currently home for over half a billion people. But recently, under the double whammy of sea level rise and inland sediment capture behind dams, they have become the most threatened coastal landscape. Here I will address several deceptively simple questions to sketch some unexpected answers using example deltas from across the world from the Arctic to the Tropics, from the Danube to the Indus, Mississippi to Godavari and Krishna, Mackenzie to Yukon. What is a river delta? What is natural and what is not in a river delta? Are the geological and human histories of a delta important for its current management? Is maintaining a delta the same to building a new one? Can we design better deltas than Nature? These answers help us see clearly that survival of deltas in the next century depends on human intervention and is neither assured nor simple to address or universally applicable. Empirical observations on the hydrology, geology, biology and biochemistry of deltas are significantly lagging behind modeling capabilities endangering the applicability of numerical-based reconstruction solutions and need to be ramped up significantly and rapidly across the world.