

Unravelling the Enigma called Coast – John Jacob Puttur, Indian Navy (Retired)

We are all quite familiar with coast, yet it remains an enigma, particularly when it comes inferring the coastal processes. Unlike land and sea, the coast is difficult place to survey or study. There is no suitable platform to survey the coast as yet. The hydrographer, whose primary job is to survey the sea and its adjoining coast, only manages to map the low and high water lines, and the coast that lies in between remains practically unsurveyed. Coastal scientists and engineers however study the coast on models, hydraulic or mathematical. The models are invariably based on the hydrographic or nautical chart, the primary instrument for marine navigation. The chart is not necessarily a tool for coastal studies. As a result, the model, hydraulic or mathematical, ends up giving a wrong picture of the 'real' coast. The problem is further compounded by an abject lack of understanding of the elements of nature that is purported to influence or drive coastal processes, namely, winds, waves and tides.

Unfortunately, even these are generally studied using models or some or other age-old myths. For example, everyone generally believes that waves are generated by winds, but 'how' has so far not been established empirically. Tidal processes are normally studied on models, yet no model can simulate the actual tidal process driven by sun and moon gravity phenomena, therefore even that goes haywire. The net result is too many incorrect inferences about coastal processes, which in turn are wrecking the coast world over. Nearly 75% of the world's beaches are eroding, and not one is due to any natural causes. Besides, ports and harbour designed after extensive 'model studies' are silting profusely. The ignorance about the coast and its processes is rampant, not only in India, but world over. However, the enigma can be unravelled by an open-minded study of the coastal problems like erosion, accretion and siltation, rather than blame all that as natural acts of nature. Everyone seems to believe that the rough

waves during the monsoon cause erosion. That is actually a myth borne out of a very popular theory that waves transport sediments, by themselves or through the littoral currents the waves seem to generate. This theory is blatantly wrong, because waves, a surface phenomenon, cannot even transport a floating body, let alone the dense sediments that must remain on the seabed due to gravity. But the experts staunchly believe in this myth. Another element that is known to affect the coast is wind. Even though it is such a common phenomenon, the experts do not seem to know how it blows. Wind blowing from high pressure to low pressure is yet another myth. Therefore, before we can get to unravel the enigma called coast, we must first understand the winds, waves and tides. Once that part is clear, we can get on to the real coastal processes. That is the main discussion in my book—*The Untold Story of a Coast*.