

Quantification of physical and chemical flux of discharging groundwater to sea in coastal areas of the Bay of Bengal

Abstract:

Groundwater discharges from the coastal aquifers to the oceans take place by the process of submarine groundwater discharge (SGD). SGD is an important pathway from transport of flux of solutes to the ocean. These discharges contain nutrient to the coastal ecosystem, along with contaminants like heavy metal, organic compound, and radionuclide, enriched by naturally or anthropogenic activities. Moreover, SGD provide an escape route for a large portion of the usable groundwater resource to sea, which might be considered for recovery in water stressed areas. There have been several studies to understand this coastal hydrodynamics; however, there is a serious lack of such knowledge from the coastal aquifers of the Indian subcontinent. The project proposal hypothesizes that groundwater gets chemically evolved as it is discharged through the seepage face along flow paths of SGD, leading to interaction of the groundwater with sea water. The project proposes to study the hydrodynamics and chemodynamics of these interactions at selected coastal aquifers adjacent to the Bay of Bengal. These would include field sampling point installation and sampling of pore waters along various transects, oriented perpendicular and parallel to the sea coast; delineation of discharge zones, aquifer frameworks and sub-surface sea water zones by non-invasive geophysical methods and geological mapping; and combining the acquired information in to generating reactive transport models of solute flux and hydrogeochemical evolutions along delineated groundwater discharging flow paths.