

5th International Conference on

OCEANOGRAPHY AND MARINE BIOLOGY

October 18-20, 2017 Seoul, South Korea

Reconstruction of paleoenvironment in coastal region based on Geo-radar signals: Illustrations from the west coast of India

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Shallow subsurface investigation along the coastal zones provides acquiescent information on the paleo depositional environment and also on the related processes involved along with. Unlike the available conventional methods of getting data through shallow boreholes or field trenches at selected locations, the ground penetrating radar (GPR) approach, in continuous mode covering a larger area in shorter time, supports the researchers to reconstruct the paleo coastal environment based on the high-resolution time section profiles. In the present study, GPR approach has been adopted to derive shallow subsurface datasets on various buried geomorphic signatures for reconstruction of paleo coastal environment. Three type areas along the west coast of India have been investigated and the time domain shallow profiles were digitally enhanced and subsequently interpreted. Site 1: The buried paleo-tsunami sediments were mapped in Guhagar coast (Maharashtra) through subsurface profiles and correlated with mineralogy and OSL data. The destruction pattern and the run-off limits were assessed based on the disfigured geomorphic sand bodies buried under the present day sand sheet cover. Site 2: The depositional pattern and the rapid growth of spit formation at Talashil coast (Maharashtra) in the last few decades, as inferred from GPR profiles, reveal the dynamic nature of the coastal processes acting in this area. The reconstruction of spit formation supports to understand the continuing dynamics in this coastal zone. Site 3: The tsunami sediments at Dive Agar coast (Maharashtra) have been mapped using 3D GPR format. Subsurface data were collected in a closely designed grid profiles. The 3D transparency reflection models have been generated based on the reflection amplitude of sand mineral deposits of Tsunami genic origin. These above cited illustrations provide an insight to understand the dynamics of the study sites in detail, for devising appropriate development plans in future.

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