

Monitoring of near shore dynamics in southwest coast of India: A video imagery approach

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The continuous monitoring of the complex near shore processes is important for scientists and coastal engineers. The near shore domain is being highly dynamic in nature; continuous sampling with traditional in situ sensors is significantly poor as the deployment of instruments is costly and risky. In such environment, remote sensing is a promising tool for measurements, but satellite imagery or aerial photography has its limitations during adverse weather conditions. Hence, optical investigations through video cameras have become a powerful and cost-effective tool for long-term data collection of near shore processes. In view of this, a new coastal monitoring system was established at Thiruvananthapuram, Kerala, southwest coast of India during September 2016. This system has tremendous scope for being developed into a fully automated coastal monitoring system. The first phase of development deals with database management, pre-processing for lens

distortion correction and georectification of video imagery. The rectification is carried out using an open source toolbox 'ULISES'. The rectified pixel time stacks have been processed for near shore wave analysis. A site-specific transfer function with the pixel time stack data and in situ measurement data is designed using multi taper power spectral density estimate methods. Spectral analysis methods have been used to estimate wave parameters. The computed wave height, mean period and peak frequency corroborates with the measured in situ wave data with a mean bias -0.01 m, 0.14s, 0.0004 Hz and root mean square errors 0.15 m, 1.7 s and 0.010 Hz, respectively. The results of this study are quite encouraging by indicating that video imagery techniques have potential to be adopted as full-fledged coastal monitoring system, which is extremely useful for understanding the coastal hydro-dynamics particularly the x.