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Hydro and... Science

Morphology, hydrography and sediment dynamics in a mangrove estuary: The Konkoure Estuary, Guinea.

Capo, S., Sottolichio, A., Brenon, I., Castaing, P. and Ferry, L. 2006.

Marine Geology, 230: 199-215.

The Konkoure Estuary in the Republic of Guinea is a poorly understood atypical mangrove system. Sediment dynamics in tropical estuaries are controlled by a combination of processes including river discharge, morphology, salinity, erosion and deposition processes, the settling of mud, physico-chemical processes and mangrove swamps.
The paper presents a consistent set of data aimed at characterising the estuary and thus, increasing our understanding of tropical systems, as well as studying the impact of human intervention in the region.
To characterise the area, the Konkoure Estuary has been surveyed over a period of 3 years. In this period, water elevations, current measurements, salinity, suspended sediment concentrations, bathymetry and sediment cover have been measured. The data provide conclusive evidence that the Lower Konkoure is a shallow, funnel shaped, mesotidal, mangrove-fringed, tide dominated estuary, well mixed during low river discharge. The estuary becomes stratified during high river flows and spring tides whereas a salt wedge appears during neap tides. The Konkoure Estuary has been described as hypersynchronous, and has three terminal outlets, two of which are landward-directed, attesting to a tidal pumping effect, while the third one is seaward-directed, and is controlled by the mangrove. The suspended matter is transported by the tidal effect within the middle estuary and is therefore trapped in the Turbidity Maximum zone (TMZ). The location of the TMZ is river-controlled and is correlated with residual currents but not with salinity front. A dam, constructed 130km upstream, impacts on the hydrodynamics, and reduces the salinity intrusion by about 25%. It causes an increased low river discharge whereas its efficiency over high river flows is unclear.

Hydrography of the eastern tropical Pacific: A review. Progress In Oceanography

Fiedler, P.C. and Talley, L.D. 2006.
A Review of Eastern Tropical Pacific Oceanography, 69: 143-180.

The eastern tropical Pacific Ocean is not defined by a single ocean basin, water mass, current system, or ecosystem. Eastern tropical Pacific Ocean waters lie at the eastern end of a basin-wide equatorial current system, between two large subtropical gyres and at the terminus of two eastern boundary currents.
To determine the temporal and spatial chracteristics of this system, a large dataset of hydrographic data is reviewed. The hydrographic dataset includes maps of surface temperature, salinity, and nutrients (phosphate, silicate, nitrate and nitrite), and thermocline and mixed layer parameters, and meridional and zonal sections of temperature, salinity, potential density, oxygen, and nutrients. The maps, cross-sections and profiles are based on CTD (conductivityâ€“temperatureâ€“depth), bathythermograph, and bottle data. The data and methods used to create the hydrographic fields illustrating this review are described.
The data shows that contrasts between the equatorial cold tongue and the eastern Pacific warm pool are evident in all the hydrographic parameters. Annual cycles and ENSO (El Nino-Southern Oscillation) variability are of similar amplitude in the eastern tropical Pacific, however, there are important regional differences in relative variability at these time scales. Unique characteristics of the eastern tropical Pacific are discussed: the strong and shallow pycnocline, the pronounced oxygen minimum layer, and the Costa Rica Dome. This paper is part of a comprehensive review of the oceanography of the eastern tropical Pacific.

A comparison of video and point intercept transect methods for monitoring subtropical coral communities.

Lam, K., Shin, P.K.S., Bradbeer, R., Randall, D., Ku, K.K.K., Hodgson, P. and Cheung, S.G. 2006.

Journal of Experimental Marine Biology and Ecology, 333: 115-128.

This study evaluated the use of video transects obtained from SCUBA divers or remote operated vehicle (ROV) and point intercept transect (PIT) method from divers for monitoring subtropical coral communities.
Comparisons were made between the datasets obtained by the ROV and SCUBA diver video transect (`Diverâ€™) and the PIT method on three nearby coral sites with different hydrographies, scleractinian coral composition, dominant species and percentage cover. This implied that the ROV and SCUBA survey methods can produce higher precision in terms of detecting temporal changes in coral communities and are thus more suitable for scientific research and management purposes than the PIT method. Other advantages of using video transects by SCUBA divers or ROV include provision of permanent records for subsequent studies and public information, less field time incurred and wider survey areas.

Bathymetry from space: Rationale and requirements for a new, high-resolution altimetric mission

Sandwell, D.T., Smith, W.H.F., Gille, S., Kappel, E., Jayne, S., Soofi, K., Coakley, B. and Geli, L.
Comptes Rendus Geosciences, Volume 338, Issues 14-15, November-December 2006, Pages 1049-1062

Bathymetry is foundational data, providing basic infrastructure for scientific, economic, educational, managerial, and political work. Applications as diverse as tsunami hazard assessment, communications cable and pipeline route planning, resource exploration, habitat management, and territorial claims under the Law of the Sea all require reliable bathymetric maps to be available on demand. Fundamental Earth science questions, such as what controls seafloor shape and how seaâ€“floor shape influences global climate, also cannot be answered without bathymetric maps having globally uniform detail.
Current bathymetric charts are inadequate for many of these applications because only a small fraction of the seafloor has been surveyed. Modern multibeam echosounders provide the best resolution, but it would take more than 200 ship-years and billions of dollars to complete the job. The seafloor topography can be charted globally, in five years, and at a cost under US$ 100 M. A radar altimeter mounted on an orbiting spacecraft can measure slight variations in ocean surface height, which reflect variations in the pull of gravity caused by seafloor topography. A new satellite altimeter mission, optimized to map the deep ocean bathymetry and gravity field, will provide a global map of the worldâ€™s deep oceans at a resolution of 6-9 km. This paper describes the possibilities and reasearch needed to measure bahthymetry from space.