Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01692, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01692
EGU General Assembly 2008

Holocene coral reefs in nearshore, terrigenous sediment-influenced environments - new insights into reef development in 'marginal' marine settings

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Coral reef growth is typically associated with the shallow, warm, low nutrient waters of the tropics. Carbonate production in these settings (generally regarded as being between 30^o N and S of the equator) is typically dominated by a range of photosynthetic autotrophs (e.g., green algae) and by animals with photosynthetic symbiotic algae (e.g., corals and foraminifera). These systems are typically characterised by high rates of primary carbonate production (often producing spatially and bathymetrically extensive coral reef structures and reef-related sediment bodies) and by the development of chlorozoan sediment facies. It is increasingly clear, however, that significant areas of reef development and localised carbonate production may also occur in settings where marine environmental parameters approach the threshold levels for tropical carbonate production. These include areas that are subject to high and low (or seasonally variable) temperature and salinity fluctuations, reduced light penetration (due to high turbidity), and elevated sedimentation rates.

This paper reports findings from recent work undertaken at a range of turbid, nearshore, siliciclastic sediment-dominated settings in north Jamaica, southern Mozambique, and along the inshore regions of the central Great Barrier Reef (Australia) where, despite often high turbidity conditions and the presence of mobile siliciclastic substrates, areas of active coral growth (often with high live coral cover) appear relatively common. These are associated with true reef development in the sense that they exhibit clear topographic relief and are important local sites of carbonate ac-

cumulation. The range of coastal settings in which such reefs develop is relatively diverse, and include the leeward margins of barrier and offshore islands, along the seaward margins of open coast tidal flats and within protected coastal embayments. Reef initiation and subsequent accretion appears to have occurred at some sites above pre-existing 'highs – either earlier phases of reefal development or relict, indurated dune deposits, or in many cases above apparently unconsolidated subtidal sands and muds.

In contrast to the well lithified and encrusted framework fabrics that characterise many clear water, high energy reef settings, the internal reef fabrics associated with these siliciclastic-dominated systems contain a high proportion of coral rubble (both clast- and matrix-supported), with the sediment matrix comprising mixed carbonate-siliciclastic sands. Facies analysis illustrates the progressive influence that coral communities exert on the surrounding sedimentary environments. Although data from many sites suggests that episodic migration of nearshore sand bodies may result in localised coral mortality, coring and ^{14}C dating indicates long-term ($>$ 1000's years) reef accretion histories in these settings. A major focus of on-going work is on the development of high-resolution records of coral assemblage development, and on carbonate production and coral calcification in these settings.