

DO MACROALGAL ENVIRONMENTS LEAVE A GEOLOGICAL SIGNATURE? MODERN TEST CASE FROM KAIKOURA, NEW ZEALAND.

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Brown, red and green macroalgae in modern temperate marine environments are ecosystem-forming primary producers on rocky substrates, yet they have a poor preservation potential and few fossil examples are known from the rock record. Macroalgal forests, as carbonate producers, are largely unrecognised within the cool-water carbonate realm even though they host a wide variety of calcareous organisms with good preservational potential. Some species of molluscs, sea urchins and crustaceans only live within the understory of macroalgal forests. These, and other, calcareous flora and fauna are the key to identification of macroalgal environments in the rock record.

Modern macroalgal forests at Kaikoura, New Zealand, exhibit a clear zonation of calcareous components controlled by substrate topography, wave exposure, water depth and light penetration. The prominent live calcareous components include encrusting and foliose coralline red algae, molluscs, bryozoans, echinoderms, calcareous worms, ascidians and crustaceans, as well as sponges and other soft bodied invertebrates. The sediments accumulated beneath and adjacent to the algae at Kaikoura are bioclastic, terrigenous sands and gravels; with bioclasts of coralline algal fragments and rhodoliths, barnacles, molluscs, spirorbids and bryozoans. Although the shallow, wave exposed settings that promote growth of macroalgal forests are limited in areal extent, their contribution via skeletal carbonate may be considerable.

In the rock record, terrigenous sands and gravels rich in coralline, barnacle, mollusc, and bryozoan fragments, that occur in association with hard-substrate unconformities in a cool-water realm, must be considered as representatives of past macroalgal environments.