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Compound response of marine and terrestrial ecosystems to varying climate: Pre-anthropogenic perspective from bivalve shell growth increments and tree-rings

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Abstract

Annual growth increments were examined from shells of the ocean quahog (*Arctica islandica* L.) from northwest Norway and from tree-ring samples of the Scots pine (*Pinus sylvestris* L.) from nearby coastal areas. The reconstructed annual growth increments were used to compare growth variability in marine and terrestrial ecosystems. Spatiotemporal comparison of the growth records showed statistically significant correlation during the 19th century A.D., indicative of ecosystem-independent response to pre-anthropogenic climate variations. Geographical correlation between marine and terrestrial records was only observed at the local scale. Years with particularly low winter or high summer North Atlantic Oscillation (NAO) indices showed the best synchronization of marine and terrestrial growth. Despite strong correlation during historical time, our palaeoecological evidence suggests that marine and terrestrial ecosystems may show dissimilar growth reaction to recently observed positive winter-NAO phases.

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