

HYPOTHESES TO ACCOUNT FOR THE CLEAREST OCEAN WATERS

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ABSTRACT: Here we examine recent data from the most isolated (in many senses) part of the world's oceans in the South Pacific near Easter Island; it appears to present the clearest waters and poorest biological activity of anywhere in the planetary ocean, based on the remote view from satellites (BIOSOPE Program). We constrain the vertical exchange through surface heat fluxes and the upper ocean thermal structure, and evaluate nutrient input through this and the gradients. We discovered a chlorophyll maximum layer at 180-200 meters, one of the deepest ever observed, and which may play a key role in trapping nutrients. A simple one-dimensional model, parameterized based on data from this experiment, shows that this community represents a true end-member to oligotrophy in the ocean, whose further evolution is constrained by the optical properties of pure seawater in these, the clearest waters in the world.

KEY WORDS: Ocean color, phytoplankton, oligotrophic, nutrient, optics