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ABSTRACT

Sarah Hale

PALEOPRODUCTIVITY VARIATIONS IN THE EASTERN CENTRAL EQUATORIAL PACIFIC OCEAN ON GLACIAL TIMESCALES

Paleoproductivity records during the late Pleistocene are sparse. The equatorial Pacific and the Southern Ocean are collectively responsible for the majority of the new production in the oceans. The nutrient and carbon mass balances of these regions must be constrained in order to fully understand net global biological productivity on glacial timescales.

The geochemistry of two east-central equatorial Pacific Ocean cores (02° 33.48 N; 117° 55.06 W) and (00° 15.42 S; 113° 00.57 W) are used to examine changes in biological productivity due to nutrient upwelling on glacial timescales during the Pleistocene. The cores were recovered in March 2006 on the AMAT03 cruise, a site survey cruise for IODP Proposal 626. The total concentrations of Ca, Ti, Fe, Al, P, Ba, S, Mg, Sr, Zn and Mn were determined by a total sediment digestion followed by analysis by inductively coupled plasma-atomic emission spectrometry (ICP). Original solid forms of P for 34 evenly spaced samples throughout one core were determined using the P Sequential Extraction technique.

This study is attempting to compare upwelling and productivity records by determining temporal records of nutrient proxies, using Latimer and Filippelli (2006) which focused on the Southern Ocean. Equatorial upwelling and Southern Ocean

upwelling both appear to exhibit strong glacial timescale variability. The P geochemistry results indicate that the P signal is largely biological. The equatorial Pacific evidence, in accordance with Southern Ocean patterns, supports a nutrient budget-driven productivity signal over time.

Gabriel M. Filippelli, Ph. D, Committee Chair

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES