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Preliminary data from the Pacific Equatorial Age Transect (PEAT IODP Expedition 320/321): a contribution to the knowledge of Cenozoic ocean and climate history

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The development of the "Pacific Equatorial Age Transect" scientific program coincided with the return to operations of the newly modernized Integrated Ocean Drilling Program drillship JOIDES Resolution, in early March 2009. PEAT IODP Expeditions 320 and 321 were designed to recover a continuous Cenozoic sediment record of the equatorial Pacific ocean by coring above the paleo-position of the equator at successive crustal ages on the Pacific plate. The PEAT program was completed at the end of June 2009, and successfully recovered high quality cores in eight sites (U1331 to U1338) from the seafloor to basement, with basalt aged between 53 to 16 Ma. The recovered sedimentary record represents a unique biogenic sediment archive for most of the Cenozoic, covering the time period following maximum Cenozoic warmth, through initial major glaciations, to the Holocene. Shipboard stratigraphy and shipboard measurements on sediments have provided data needed to attain the primary objectives of the PEAT program. In particular, the shipboard work outlines a much more detailed evolution of the carbonate compensation depth (CCD) throughout the Cenozoic in the equatorial Pacific. Post-cruise research, in progress, will even better define the nature and changes in CCD, will explore its linkages to Cenozoic changes in atmospheric CO2, and will tie these CCD events to orbital insolation changes. Tuning of the age model based on orbital cyclicity will significantly improve the Cenozoic age model and test the co-occurrence of CCD events across the equatorial Pacific.
As shown by preliminary shipboard data, biogenic calcium-carbonates and biosiliceous sediment components of the PEAT record provide key material for post-cruise fundamental studies relating microfossil evolution and climatic and environmental changes. The observed faunal and floral turnovers will be studied in detail with the specific objective of recognizing the relationship between the calcareous and siliceous primary producers within the observed decimeter to meter lithological cycles, and relating the observed changes to photic zone paleoecology, production, export productivity and dissolution.