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Sedimentary variations in eastern equatorial Pacific cores in IODP Exp.321 using non-destructive core scanners, TATSCAN

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An important scientific objective of IODP Exp. 320/321 is to establish a complete stratigraphy through the Cenozoic in the equatorial Pacific region, integrated with previous studies of ODP/DSDP. Our goal in this study is to reconstruct sedimentological paleocanography in millennium scale to long time scale in intertropical convergence zone (ITCZ) through Pliocene to the recent,. To achieve high time-resolution sedimentological analysis for long cores, we used non-destructive core scanners "TATSCANs"; X-ray fluorescence (XRF) core scanner "TATSCAN-F2", spectroscopic imaging core scanner "TATSCAN-S1" and transmitted X-ray imaging core scanner "TATSCAN-X1". We have analyzed more than 100m archive half splice sections in site U1337, which reaches about 5.7Ma on the basis of onboard magnetostratigraphy.
Ca and Si content show mirror image which directly represents the repeated changes of major lithologies of calcareous ooze and siliceous ooze. Time interval of the turnaround shows 100 kyr cycle in late Pleistocene, and there are 40kyr cycle in early Pleistocene. Total Fe and K content correspond to Si content since late Pliocene in general, however, below around 60m in early Pliocene, the relationship of total Fe and K with Si content shows reversal. These elemental changes clearly correspond to physical properties measured onboard; low density and high magnetic susceptibility in siliceous ooze, and high density and low magnetic susceptibility in calcareous ooze. Spiky or broad Mn content peaks appear independent of other elements. The former one represents light colored, very high density in transmitted X-ray image, hard concretion which appears sporadically in any lithologies. The latter one mainly represents dark colored, slightly high density in transmitted X-ray image, firm siliceous ooze. Sediment color reflects basically the lithologies such as high L*/ low b* value in calcareous ooze and low L*/ high a* value in siliceous ooze measured by spectroscopic imaging core scanner. Especially for a*, reddish color strongly correlates to Fe and Mn content but there are many a* variations with their content level.

Keywords: IODP, PEAT, sediment core, core scanner, TATSCAN