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Signatures of intra-crater seiches of IODP-ICDP expedition 364 (Site m0077) in the Chicxulub crater

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The topmost impact related unit of Hole M0077 of the joint IODP-ICDP expedition 364 on the peak ring of the Chicxulub impact structure in Mexico, is a 76cm thick graded silty 'transitional interval' from 616.58-617.34 mbsf. It occurs just below the basal Paleocene background crater filling of pelagic limestone/marl and contains the main and Ni, Cr, Ir anomaly in the uppermost part. Elsewhere such unit had been termed "KPg boundary cocktail" a) and represents the final settling of fine particles out of a suspended, turbulent cloud of sediment in the aftermath of the impact disturbance. Although the entire 76 cm is a graded siltstone, it contains many thin laminations of very fine sand that locally display a peculiar type of micro cross-bedding. The cross-bedding pinches and swells, and bears a reminiscence to aeolian type of cross-bedding, albeit on a much smaller scale (sub-cm vs. tens of meters). Typical of aeolian cross-bedding is the often highly variable angle of the fore-set laminations within a cross-bed set due to ever changing wind directions and strength. We assume that this micro-crossbedding in the transitional interval is also deposited under weak, but highly variable current strength and possibly current directions. The mechanism we hypothesize here is that just after the resurgence of the sea in the Chicxulub crater a seiche developed within the crater and oscillated many times across the entire crater basin before it was dampened out completely only at the very top of the transitional interval. Similar laminations and crossbedding were observed in the corresponding interval of ICDP drill core Yaxopoil-1, and at the top of the tsunami-sequence around the Gulf of Mexico, e.g. La Lajilla and Mimbral,b), indicating that after passage of the first tsunami waves, the enclosed Gulf of Mexico basin numerous seiches were generated during deposition of the main Ir influx.

a)Bralower, T.J.et al 1998, *Geology* 26, p331.b)Smit et al 1994, *GSA spec.Pap* 307, p151.