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Mass Extinction due to the environmental catastrophe driven by the encounter with a dark cloud

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The Earth has undergone mass extinction five times in Phanerozoic eon. Alvarez et al. (1980) pointed out that an impact of an extraterrestrial body causes Cretaceous-Tertiary extinction. However the recent studies revealed that the asteroid impact has several difficulties to explain the extinction event. In order to explore the reason of this mass extinction at K-Pg boundary, we studied the data of Iridium in the deep sea sediment around the K-Pg boundary and found a broader component of an enhancement in Iridium concentration around the central peak, which correspond to the asteroid impact. The width of this broad component is as broad as several meters, which is difficult to explain by mixing or remobilization after an instantaneous deposition (Hull et al. 2010). This broader component could be caused by an increased flux of cosmic dusts due to the encounter to a dark cloud. The sunscreen effect of cosmic dusts in stratosphere may lead a global cooling (Pavlov et al. 2005). The sub-GeV component of cosmic rays increased by a large factor due to the dense molecular gas from dark cloud to lead the destruction of ozone layer (Kataoka et al. 2012). Such an environmental catastrophe, which continued several ten M years, may be the real reason of the mass extinction at K-Pg boundary. The asteroid impact at K-Pg may also be one of the consequences of the dark cloud encounter: Its gravitational potential could perturb the orbits to lead an asteroid/comet shower.