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Oceanic redox and land vegetation across the Cretaceous/Paleogene boundary in Caravaca, southern Spain

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An extraterrestrial impact at the Cretaceous/Paleogene (K/P) boundary ca. 65.5 million years ago caused a mass extinction and rapid changes of surface environment on the Earth. Here we report changes of oceanic redox and land vegetation across the K/P boundary at Caravaca, southern Spain using sedimentary organic molecules. The results reveal that the basal 3-mm thin layer of the K/P boundary-clay is marked by a rapid increase in concentrations of terrestrial long-chain n-alkanes and dibenzofuran, indicating a destruction of land vegetation and an increase in supply of terrestrial organic matter into the marine environment at the K/P boundary. This layer also have a rapid increase in concentrations of dibenzothiophene, indicating a change in redox conditions from oxic to anoxic/euxinic conditions. The low-oxygen condition could have been caused by an increase in flux of terrestrial organic matter into the ocean. A rapid increase in concentrations of retene and retene/cadalene occurred in the upper part of the boundary-clay, indicating a recovery of angiosperm which withered at the K/P boundary.