Fish fauna paleobiodiversity during the Late Cretaceous and Paleogene CO_2 greenhouse crises: the *Fossil-Lagerstätten* record of northeastern Italy

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Recent graphic correlation of horizons of exceptional preservation of fishes in different parts of the World evidenced that exceptional fossil preservation can be correlated over wide areas and different depositional contexts. Certain time intervals in deep time appear to be conducive to exceptional preservation of fossils and, as a consequence, the origin of *Konservat-Lagerstätten* was probably promoted in coincidence with global environmental changes, including oceanic anoxic events, mass extinctions and, more generally, with high concentrations of atmospheric carbon dioxide. The so-called "*Greenhouse Preservation Hypothesis*" (Retallack, 2011) suggests therefore that spikes in atmospheric CO_2 coincide with widespread exceptional preservation, being consequences of transient global perturbations. Such hypothesis has two main implications: 1) the possibility of an extremely precise correlation between fossiliferous deposits originated in deep and shallow water settings, allowing a detailed interpretation of the composition of the fish assemblages in different environmental settings; 2) an accurate record of the biotic effects of a global perturbation at the higher trophic levels. Therefore, a succession of *Konservat-Lagerstätten* constitutes an extraordinary archive of climatic and oceanographic changes that occurred in the geological history.
The Upper Cretaceous and Paleogene stratigraphic record of NE Italy includes several *Konservat-Lagerstätten* (e.g., Montenars, Trebiciano, Sòlteri, Monte Solane, Monte Postale) with exquisitely preserved fishes, in many cases virtually unknown or only superficially investigated, thereby representing an unexploited archive of the main perturbations that occurred from about 100 to about 40 Ma.
The project aims to substantially contribute to the knowledge of the fish diversity of these *Konservat-Lagerstätten* and to characterize their stratigraphic, paleoenvironmental and paleoclimatological significance. The proposed investigation will provide also new insights on the evolution of Late Cretaceous-Paleogene marine fishes from a Tethyan perspective.

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References

Retallack, G.J., 2011. Exceptional fossil preservation during CO_2 greenhouse crises? Palaeogeography Palaeoclimatology Palaeoecology 307, 59–74.