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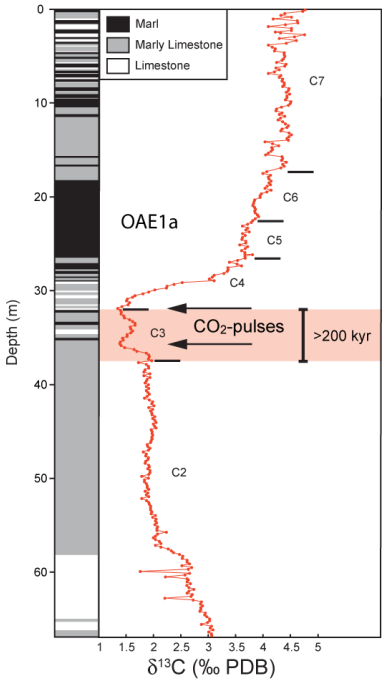
Start of project: 2012

Unraveling the Onset and Spread of Cretaceous Anoxia

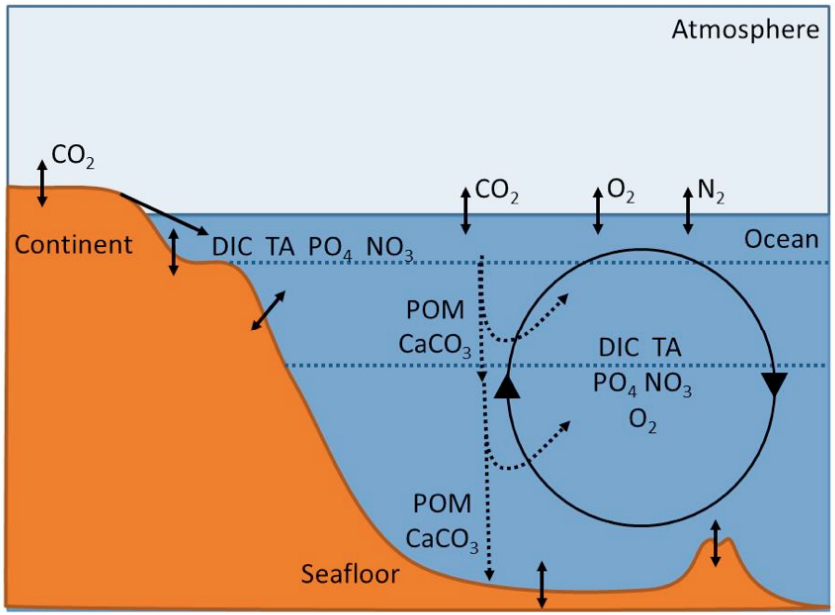
Aim: : We propose to explore Cretaceous times series data in order to understand the controls on oceanic oxygen conditions, to decode the triggering mechanisms for major oceanic anoxic events (OAE1a, OAE2), and to better predict the long-term evolution of dissolved oxygen concentrations in the future ocean.



High resolution $\delta^{13}C$ record in core LB1 at La Bédoule. Duration of the CO_2 release period is based on sedimentation rates calculated from orbitally tuned Aptian timescales.

Goals: Provide new high-resolution time series data for the onset, spread and termination of OAE1a and OAE2 and improve benthic-pelagic modeling tool (BPM) to simulate isotopic composition of seawater and sediments.

Goals continued: Set-up and run the University of Victoria Earth System Climate Model (UVic) applying Cretaceous boundary conditions and couple BPM.



Model set-up applied for the simulation of the future evolution of the oceanic oxygen state. Low resolution earth system model includes continental weathering processes, volcanic and metamorphic degassing, riverine fluxes, the exchange of gases across the ocean/atmosphere interface, exchange fluxes at mid-ocean ridges and biogeochemical cycling of particulate organic matter (POM), carbonate ($CaCO_3$), dissolved inorganic carbon (DIC), total alkalinity (TA), dissolved phosphate (PO_4), nitrate (NO_3), and oxygen.