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Coccolithophore and foraminifer paleoproductivity changes related to wind-driven upwellings in the SE Pacific since the LGM

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Since the LGM, model calculations have emphasized the central role of the Southern Ocean (SO) as a key component of the global climate system. It is proposed that latitudinal shifts and intensity variations of the Southern Western Winds (SWW) would have significantly influenced the CO₂ exchanges in the Ocean-Atmosphere system, regulating i) the ocean's deep ventilation (water stratification vs. upwellings); ii) the biological pump (primary production); and/or iii) sea ice extent. As the SWW are in part driven by the latitudinal thermal gradients, most palaeoceanographic inferences on their activity in the past, are based on sea surface temperatures. Limited empirical evidences highlight upwelling intensity and ocean productivity changes associated to movement of oceanic fronts. The aim of this study is to infer the changes in the primary production and the wind-driven upwellings of the southeastern Pacific since the LGM, focusing on coccolithophore and planktic foraminifera assemblages of a CALYPSO piston core (MD07-3088), collected off the south Chilean margin (46°04.30'S; 1536m). It will help assessing changes in the oceanic front dynamic of the SWW-SO coupled system, for a better understanding of the global atmospheric CO₂ variations. The MD07-3088 core benefits a robust chronology that has been assessed by a previous detailed tephrostratigraphy study supported by 23 AMS ¹⁴C dating and a high-resolution δ¹⁸O stratigraphy. The preliminary records including CaCO₃ contents, coccolith absolute and relative abundances and foraminifera absolute abundances, document enhanced coccolith and foraminifer abundances during the Last Glacial/Interglacial Transition (LGIT), probably tied to enhanced wind-driven upwellings.