A sediment trap evaluation of B/Ca in planktonic foraminifera as a carbonate system proxy

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Core-top and culture studies of foraminiferal B/Ca indicate that the incorporation of borate ion into the foraminiferal calcite lattice is related to ambient seawater carbonate chemistry [1-3]. Few sediment trap studies have been carried out to corroborate these results [4]. Rapidly declining carbonate saturation due to a rise in anthropogenic CO_2 coupled with extensive upwelling in the California Current System highlight the necessity to better understand ocean acificiation in this region. Our sediment trap analysis in the Santa Barbara Basin will resolve changing geochemistry of the marine carbonate flux on a bi-weekly basis in response to wide range of naturally varying ambient hydrographic conditions. We present B/Ca results for a full annual cycle (Oct '13-Oct '14) for a surface mixed layer species (*Globigerina bulloides*) and a thermocline dwelling species (*Neogloboquadrina dutertrei*) both of which are symbiont-barren. These results indicate no significant influence of size fraction on B/Ca for either species. Higher concentrations and a larger seasonal range of B/Ca are observed for *G. bulloides* (60-98 μmol/mol) than *N. dutertrei* (38-53 μmol/mol). Seasonal trends are similar for both species, with the lowest B/Ca values associated with spring upwelling. Generally, seasonal B/Ca fluctuations of *G. bulloides* precede the B/Ca response seen for *N. dutertrei*, which can be offset by up to a month. Water column TA and DIC collected in the basin for 25 months ('07-'10) were used to estimate average monthly carbonate system parameters and compared to our sediment trap B/Ca results. This comparison will be used to establish calibration relationships and to evaluate the influence of carbonate ion concentration and other hydrographic parameters such as temperature, salinity and phosphate on boron incorporation.

[1] Yu *et al*. (2007) *Paleoceanography* **22**. [2] Foster *et al*. (2008) *Earth Planet.Sci.Lett*. **271**, 254-266. [3] Allen *et al*. (2012) *Earth Planet.Sci.Lett*. **351-352**, 270-280. [4] Babila *et al*. (2014) *Earth Planet.Sci.Lett*. **404**, 67-76.