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Reliability of Barite as Tracer of Export Production (the BARMED Program)

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Barite ($BaSO_4$) is one of the most promising proxies for reconstructing productivity in the ocean, but so far, it has essentially been used as a qualitative tool. Dymond et al. (1992) and François et al. (1995) however, proposed empirical algorithms linking export production with barium fluxes in the water column. To confirm or invalidate these relationships is one of the BARMED (BARium in the MEDiterranean) program objectives. With this aim, sediment trap material from the western sector of the Mediterranean Sea, collected from two traps located at 200 and 1000 m at the Dyfamed site ($43\,\mathrm{deg}$25N-$7\,\mathrm{deg}$52E), was analyzed for Ba and particulate organic carbon (POC) between 1995 and 2003 (over a total period of 2.5-year).

Ba and POC fluxes correlate very well at the Dyfamed site ($r>0.9$). But, based on independent calculations from ^{15}N measurements, neither Dymond et al. nor François et al. equation seems able to provide a good export estimate. In addition to our results, we compiled data of trapped Ba and POC published so far. It appeared that one single algorithm cannot reconstruct export production for the global ocean. We propose that essential parameters like site location, depth and trapping efficiency should be taken into account if one is to use the barite proxy on more than a qualitative basis.