

# Seasonal and interannual particle export in an African rift valley lake: A 5-year record from Lake Malawi, southern East Africa

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ABSTRACT: A time-sequencing sediment trap was deployed at 300-350 m in Lake Malawi, East Africa, from 1987 to 1992 to measure particulate export to the deep, anoxic hypolimnion in the northern and central lake regions. The monthly settling particulate samples provide a data set of seasonal and interannual export fluxes of organic carbon, biogenic opal, calcium carbonate, and lithogenic material. Maximum total particle fluxes (;50-400 mg m22 d21) occurred primarily during the dry, windy season (April through October) when algal productivity is high because of wind induced upwelling of nutrient-enriched metalimnion and hypolimnion waters. Peak-flux particulates contained an abundance of Aulacoseira and Stephanodiscus diatom valves and chains. The total particle mass flux during the wet, austral summer months (November through March) was consistently one to three orders of magnitude less than that measured during the dry months and consisted of mineral shards, terrestrial plant debris, and scattered diatom tests. The 5-yr trap data provide support for the claim that the light-dark lamination couplets, abundant in northern and central lake cores, reflect seasonal delivery to the sediments of diatom-rich particulates during the windy months and diatom-poor material during the wet season. However, interannual and spatial variability in upwelling and productivity patterns, as well as El Niño-Southern Oscillation (ENSO)-related rainfall and drought cycles, appears to exert a strong influence over the magnitude and geochemical composition of particle export to the deep hypolimnion of Lake Malawi.