A Decade of Biogeochemical Investigations at the European Time Series Station ESTOC

* Neuer, S (susanne.neuer@asu.edu) , Arizona State University, School of Life Sciences, Tempe, AZ 85287-4501 United States
Cianca, A (Andres.Ciancaaguilar@asu.edu) , Arizona State University, School of Life Sciences, Tempe, AZ 85287-4501 United States
Helmke, P (peer.helmke@asu.edu) , Arizona State University, School of Life Sciences, Tempe, AZ 85287-4501 United States
Rueda, M (mjrueda@iccm.rcanaria.es) , Instituto Canario de Ciencias Marinas, Carretera de Taliarte S/N, Telde, 35200 Spain
Llinas, O (ollinas@iccm.rcanaria.es) , Instituto Canario de Ciencias Marinas, Carretera de Taliarte S/N, Telde, 35200 Spain
Santana-Casiano, M , University of Las Palmas de Gran Canaria, Faculty of Marine Science, Las Palmas, Spain
Gonzalez Davila, M (mglez@cicei.ulpgc.es) , University of Las Palmas de Gran Canaria, Faculty of Marine Science, Las Palmas, Spain

Basin wide modeling studies have revealed a clear asymmetry of the biogeochemistry across the subtropical North Atlantic gyre, mainly relating to the magnitude and processes of nutrient supply and new and export production. Time-series measurements of the actual biogeography are needed to confirm and understand the inherent variability. Here we present time-series measurements carried out in the eastern boundary system of the subtropical North Atlantic gyre at the European Station for Time-Series in the Ocean, Canary Islands (ESTOC), located 100 km north of the Canary Islands. Standard water column properties have been measured at the station since 1994 in monthly intervals; monthly measurements of pCO2 were added in 1996. Primary production has been inferred from the in situ chlorophyll concentration by applying a bio-optical model and by satellite and amounts to about 12 mol C m-2 yr-1. Particle flux has been measured with moored particle traps at the station since 1991, supplemented by surface tethered traps in some years. Particulate organic carbon export extrapolated to 150 m depth amounts to about 0.2 mol C m-2 yr-1, determined both by surface-tethered and shallow moored sediment traps. Net CO2 fluxes at ESTOC are positive with an average value of 0.05 mol CO2 m-2 yr -1, mainly controlled by SST and by the predominant Trade Winds. Net community production determined by the biologically induced drawdown of dissolved inorganic carbon amounts to 2-4 mol C m-2 yr-1 when integrated over the mixed layer. Nitrate input into the mixed layer by wintertime convection allows a potential new production of about 0.2-1 mol C m-2 yr-1 depending on the depth of wintertime convection. In addition to showing the seasonal and interannual variability in its biogeochemistry, we will intend to reconcile the physical and biological components of the carbon balance and nutrient budgets at ESTOC.