The Porcupine Abyssal Plain open ocean observatory (PAP): Variations and trends from the Northeast Atlantic fixed-point time-series


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Introduction and International Context

The Porcupine Abyssal Plain fixed-point sustained observatory [PAP-SO] is situated in the sub-polar Northeast Atlantic (49ºN, 16.5ºW) in a water depth of 4800m and at a location which is as remote as possible from the complexities of the continental slope and the mid-Atlantic ridge. It is the longest running open ocean time-series observatory in Europe and one of the longest in the world. Over the past 20 years it has produced high resolution in situ time-series data of climatically and environmentally relevant variables from the entire water column and the seafloor beneath. The PAP site is one of the 9 core observatories in the EuroSITES network (1b) (funded 2008-2011) and is also an International OceanSITES time-series reference station (www.oceansites.org). Over 225 peer-reviewed papers have been published on the PAP-SO since 1975 including a recent special issue in Deep Sea Research.

Multidisciplinary time-series: surface to seafloor

Upper Ocean: Since 2002, a multidisciplinary set of sensors on a full-depth mooring have produced high resolution in situ time-series dataset of climatically and environmentally relevant ocean variables from the euphotic zone. These include sub-surface (~30 m depth) measurements of temperature, salinity, chlorophyll-a fluorescence, nitrate and pCO2. Recent enhancements to the mixed layer variables include O2 and PAR (irradiance) and an water sampler at 30 m on the 1989-2007 time-series of Particle flux (dry mass), clear inter-annual and seasonal variation; and 3b) sediment trap deployment at PAP. 3c) MODOD lander design: Acoustic telemetry communication to PAP mooring; 3d) Bathysnap camera system (schematic); 3e) Phytoheterotrophic time-series from Bathysnap camera

Seafloor: Over 20 years of sampling the abyssal seafloor (4800 m) at PAP has revealed that benthic ecosystems and geohistory are intimately linked with ocean surface processes through variations in POC flux quantity and/or quality arriving on the seafloor. All components (and size classes) of the benthic ecosystem communities show a response to benthic-pelagic coupling. Since the 1980’s an autonomous time-lapse camera system, Bathysnap, has been used taking 8 hourly still images.

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Open Access to Data in near real-time: PAP-SO ocean and atmospheric data are sent in near real-time from the upper 1000m through lidar telemetry to NOC, Southampton acting as the PAP and EuroSITES Data Assembly Centre. Data are available through the EuroSITES website (www.eurosites.info) and CORIOLIS ftp site (ftp://ftp.clim2000.pol.ac.uk/oceansites/). Physical datasets [temperature and salinity] are sent to the Global Telecommunication System (GTS).

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