Oases in the deep-sea: Why do they grow where they grow

Deep-sea corals and sponges are often found in areas where topography interacts with the regional hydrography, creating favorable conditions for reef development. How these reefs can sustain themselves and what they are thriving on is still largely unknown. Specifically, since the deep-sea is a naturally food limited environment where the input of organic matter decreases with depth. Over the last year several of these hotspots of biodiversity and biomass were studied using benthic lander systems to unravel near-bed environmental conditions near these reefs, but also to identify and quantify the food supply to these systems. In the EU funded project SponGES we have investigated a rich sponge ground at the summit of a seamount along the Artic Mid Oceanic Ridge, studying vertical submesoscale ocean dynamics. Seamounts can be sites of large energy conversion from oscillating tidal waves to internal waves, which give rise to accelerated currents and other seamount-scale circulation patterns, which increase food supply and particle retention. The seamount summit is situated at the interface of two water masses delivering alternating beneficial water properties to the sponge communities due to the diurnal isopycnal displacement generated by the interaction of topography with oscillating tides. Internal tides produce highest currents in winter with a maximum of 70 cm s^{-1}, leading to resuspension of material in the benthic boundary layer. The year-long lander deployment revealed only one peak of extended supply of fresh fluorescent particles in late May. This short food pulse will never suffice to sustain the whole system leading to the assumption that there is intense recycling of OM and nutrients in the benthic boundary layer, the so-called reef effect. In this talk we will not only show recently acquired data on the sponge ground in the arctic but will also compare this study with other areas with similar characteristics.