

Oceanography Seminar

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“Development of a Hadal Water Column Profiler”

The hadal zone, between 6500m and 11,000m, represents the deepest 40% of the ocean's depth range. Practically nothing is known about the circulation, mixing, chemical properties, and biological communities that are within water column of the hadal zone. However, radionuclide analysis suggests the deep ocean trenches have short residence times relative to the abyssal circulation. Understanding the mechanisms that could drive the ventilation is hampered by a lack of suitable instrumentation with which to make observations. We have obtained funding to develop a profiler, that will for the first time, enable high-quality multidisciplinary physical, chemical, and biological sampling of the hadal water column. The Hadal Water Column Profiler will collect vertical profiles of turbulent microstructure (mixing), horizontal velocity, conductivity, temperature and dissolved oxygen during its descent. On ascent it will collect a series of water samples at user-defined depths for trace element, nutrient and other determinations. In addition acoustic backscatter and video images will be recorded providing data on relative biomass and identity of the biological communities, enabling a multidisciplinary characterization of the Hadal water column. The profiler will have a total cycle time of approximately 8 hours for the 11,000 m descent and ascent, which will allow observations to be made that resolve physically and biologically relevant time scales.

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