

## **Beyond the Abyss: A contemporary perspective on Hadal science**

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The deepest parts of the world's oceans – the hadal zone – is named after *Hades*, the Kingdom of the Underworld. Despite the deterrent and 'unseen' connotations of its name, recent years has seen a renaissance in the exploration of the hadal ecosystems (6000 to 11,000m) which represents one of the last great frontiers in marine science. This biozone accounts for 45% of the total ocean depth range and comprises a disjunct array of trenches formed by subduction at convergence zones. From a biological perspective, recent developments have in large been prompted by technological advances that have made this otherwise largely inaccessible frontier a viable subject for research.

Since 2007, the Hadal-landers have now been deployed in the hadal trenches over 180 times over 15 cruises in seven trenches in the Pacific Ocean (the Japan, Izu-Bonin, Mariana, New Hebrides, Kermadec, Tonga and Peru-Chile trenches), plus adjoining areas or abyssal trenches (e.g. South Fiji Basin, South Shetland Trough).

As these ever increasing data sets become available, the more it is apparent that the hadal faunal community does not sit well alongside its littoral, bathyal or abyssal neighbours: it appears distinctly different. This realization comes as deep-sea science moves away from explaining everything as a function of depth towards a growing appreciation of a complex interaction between extreme physiological adaptation to high pressure and the complex and volatile geological setting. This presentation will explore some interesting recent discoveries and discuss some hypotheses that are emerging regarding habitat heterogeneity, biodiversity, ecology and phylogenetics over large bathymetric and geographic ranges.