



Recent past and future progress in tectonics and dynamic Earth processes (Earth Connections and Earth in Motion) resulting from scientific ocean drilling as part of the International Ocean Discovery Program, IODP

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50 years of scientific ocean drilling have spanned the full range of scientific topics within the themes Earth Connections and Earth in Motion. Subjects have included investigation of every element of the plate tectonic process through to the dynamics and societally-relevant aspects of surface and shallow subsurface Earth processes. Scientific ocean drilling, in many cases, offers the only opportunity to access in situ and complete geological records of tectonic processes, or to measure and monitor the in situ properties of active Earth processes. Technological developments and advancements have, in parallel with our changing understanding of Earth system processes, increased our ability to recover different rock and sediment types, to reach greater depths below seafloor, to take accurate in situ measurements of hydrological systems, slope failure planes and active fault planes, and to install observatories 100's-1000's m below the seafloor. Recent projects have included study of the petrology and geochemistry of mid ocean ridge processes and forearc/arc development, subduction initiation, multiple stages of the rifting process, the range of subduction fault slip processes including large tsunami-generating earthquakes and slow slip, seafloor serpentinisation, major continental breakup and tectonic-paleoceanographic gateway development, and the dynamics of impact cratering. This presentation will summarise some of the most significant discoveries and future planned projects, focussing on the recent phases of the scientific ocean drilling program (IODP).