Post-2013 Scientific Ocean Drilling Status

Science Plan published (iodp.org)

U.S. Milestones completed (all positive to date)
National Research Council Review (science review of previous program and future potential) http://dels.nas.edu/Report/Scientific-Ocean-Drilling-Accomplishments-Challenges/13232
Internal NSF-GEO review completed
Outside consulting company reviews NSF facilities: no findings for IODP

- May 2012: NSF presents case for new program to National Science Board (NSB)

- July 2012: NSB decision

Illuminating Earth's Past, Present, and Future



THE INTERNATIONAL OCEAN DISCOVERY PROGRAM EXPLORING THE EARTH UNDER THE SEA

SCIENCE PLAN FOR 2013-2023

Drilling to Understand Seismicity at Subduction Zones



Expedition 343 - J-Fast

D/V Chikyu April 1 - May 24, 2012

To understand the physical mechanisms and dynamics of large slip earthquakes

1) characterize the fault and wall-rock composition, fault architecture

2) characterize the nature of stress heat and pressure within and around the fault zone





Two riserless holes drilled to 1000 mbsf

JFAST-4 logging-while-drilling hole to determine in situ stress and locate the fault zone JFAST-3 to acquire core samples from the fault zone Each hole will be completed with an observatory deployment comprising a suite of temperature and pressure sensors

NanTroSEIZE: The Nankai Trough Seismogenic Zone Experiment

Node B

C0006/7

P Node A

C0001

C0010

C0002

150 km

0009

Remaining tasks: completing of deep hole (C0002) to 7 km, long-term monitoring, connect to DONET

A multi-stage effort to sample and instrument the plate boundary fault zone across the up-dip end of locking and rupture

Node E 🤇

10 KI

Expedition 338 D/V Chikyu Sept. 2013 – Jan. 2013 Riser drilling of C0002 from 382 mbsf to 3600 mbsf

C0012

Node C

C0011

CRISP - Costa Rica Seismogenesis Project IODP Exp 334 - 15 March to 13 April 2011 IODP Exp 344 - 23 Oct. to 11 Dec., 2012





Objectives:

- 1. Characterize the lithological, physical, and frictional properties of the upper plate
- 2. Estimate the subduction channel thickness and rate of subsidence of upper plate
- 3. Determine the change in stress across the updip exent of the seismogenic zone
- 4. Characterize the fluid flow system and thermal structure of the margin

Proposed:

Hikurangi - Drilling into a Slow Slip Earthquake Source Region



SSEs recur every 2 years at <5-15 km depth in this location and offer excellent near-source monitoring opportunities



A three phase project to unlock the secrets of slow slip that involves 1) shallow drilling; 2) deep drilling to intersect the SSE source area; and 3) long-term borehole monitoring

Phase 1: Seven shallow (~400-1200 m below the seafloor) riserless sites to collect samples and geophysical logs of the overriding and subducting plates, and install observatory equipment to monitor near-surface changes in deformation, seismicity and physical properties throughout a SSE cycle.