

INTEGRATED OCEAN DRILLING PROGRAM 2003-2013

Detailed Planning Group (DPG) on Hotspot Geodynamics

1. General Purpose. Volcanic chains associated with deep-seated mantle plumes potentially provide valuable information on mantle geochemistry and geodynamics, particularly in establishing the existence and magnitude of true polar wander. Several current IODP proposals (620-Full3 Hotspot Seamounts, 636-Full2 Louisville Seamount, 669-Full Walvis Ridge Hotspot) focus on drilling hotspot chains to address themes related to hotspot-generated volcanic lineaments, including hotspot motion, the temporal evolution of hotspot mantle sources, plate-motion reference frames, and mantle-plume models. The Hotspot Geodynamics DPG should review current approaches and produce a written report that lays out an optimal drilling, logging, and post-expedition science plan for addressing the above objectives.

2. Mandate. In particular, the Hotspot Geodynamics DPG should address the following questions:

- What are the minimal or optimal paleomagnetic observations necessary to distinguish true polar wander versus hotspot drift? How many sites are necessary within an ocean basin? In how many ocean basins must seamount chains be drilled? What is the most appropriate order of drilling?
- What geochemical tests are available for discriminating among deep plumes, shallow plumes, or no plumes? How well can geochemical data be used to estimate mantle potential temperatures? What is the best strategy for assessing the geochemical evolution of seamounts by drilling?
- What independent data are provided by mantle flow models? How can seamount paleolatitudes be incorporated to improve these models?
- What is the best strategy to obtain robust paleolatitude estimates from a single seamount? What depth of penetration and how many flows are needed to average secular variation?
- How can independent types of paleolatitude information (e.g., sediment paleoequator, seamount paleopoles) be used better to test true polar wander?

3. Decisions. The Hotspot Geodynamics DPG shall make decisions by consensus.

4. Term and Meetings. The Hotspot Geodynamics DPG shall have a term of one year, extendable if necessary after review by the SPC. It may convene up to biannually and may hold additional electronic meetings as appropriate. The SPC chair shall approve meeting agendas, dates, and locations, and the IODP-MI vice president of science planning shall authorize the meetings. The DPG chair shall submit meeting minutes to the IODP-MI science coordinators within one month of each meeting.

5. Membership. The SPC shall choose the DPG members for their expertise and experience with respect to the assigned mandate. The DPG may have a maximum of fifteen members, including at least two members from each of the main IODP members with lead agency status and at least one member from each of the other IODP members. The DPG members shall have initial terms of one year, extendable upon SPC approval of an extended term of activity for the DPG.

6. Chair. The SPC shall appoint the chair of the Hotspot Geodynamics DPG.

7. Liaisons. The SPC may appoint a liaison to the Hotspot Geodynamics DPG.