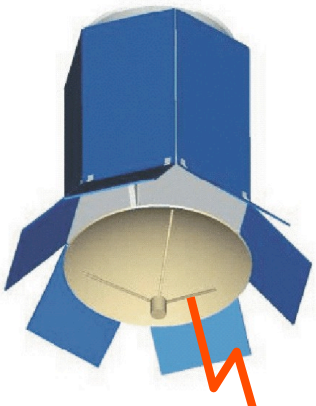
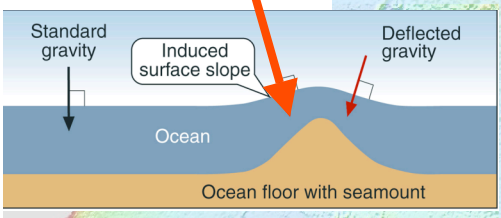




Fact Sheet

Abyss-Lite*

An altimeter for geodesy and mesoscale oceanography

Method

• Radar measurement of sea surface slope reveals gravity anomalies & ocean flows

Themes

• The fine-scale (200-km to 5-km) ocean shape yields bathymetry, gravity anomalies, and deflections of the vertical (VD) unavailable by other means

• The non-repeat orbit monitors ocean currents and eddies unseen by other missions

Complements Related Missions

• GRACE, Champ and GOCE sense gravity at orbital altitude, where resolution is limited to ~200 km; Abyss-Lite measures gravity at sea level, where resolution down to ~ 5 km is available.

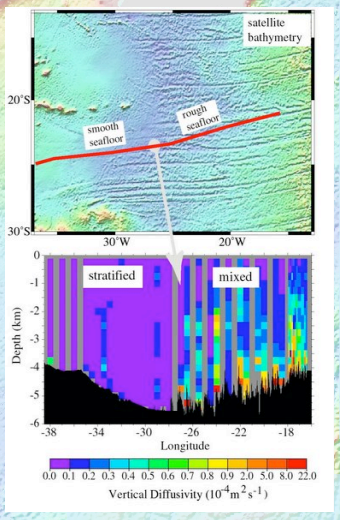
•Abyss-Lite's drifting orbit fills holes in the exact-repeat orbits covered by TOPEX/Poseidon, GFO, Envisat, and Jason-1, enabling fine-scale geodesy and detailed recovery of mesoscale eddies.

Implementation

• ~800-km orbit, inclination ~125˚ (preferred) or ~50˚, non-repeat, ~22-day near-repeat

• Fine measurement precision, near-shore tracking, resistance to "wave noise" implies a Delay-Doppler radar altimeter, small s/c, on-board processing

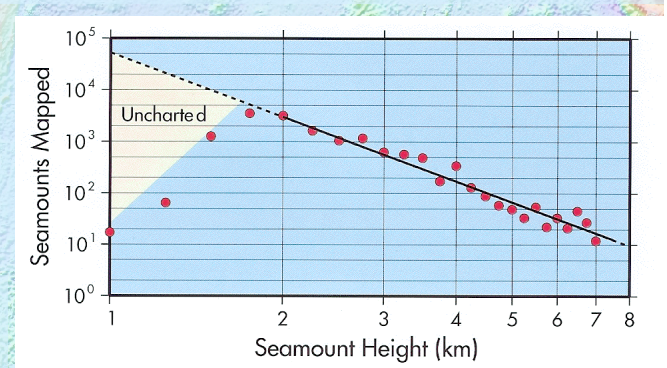
• Geodesy and mesoscale oceanography; 6-y mission



Science

• Ocean bottom shape and roughness control tsunami propagation, steering of flows, mixing rates, heat transport, global climate & sea level.

• Ocean floor structure answers fundamental science questions about Earth's magma budget, volcanism tectonics, and seismic hazards.



A new Bathymetry from Space mission should find 50,000 unmapped seamounts (yellow area). A 2-fold improvement in seamount height precision should increase the total number of seamounts mapped by 18-fold. The proposed mission will yield a 20-fold improvement in areal resolution of the marine gravity field and bathymetry.

Applications

• Bathymetry aids habitat management, ecology, cable and pipeline routing, & Law of the Sea.

• Gravity field details enable precision inertial navigation and resource exploration.

• Real-time sea level anomaly observations enable operational oceanography.

Participants and Endorsers

National Oceanic and Atmospheric Administration
University of California (San Diego)-Scripps
Johns Hopkins University Applied Physics Laboratory
~100 signatories from academia, civilian and military operational agencies, and international organizations

Cost and Schedule

$75M (2-string altimeter, WVR, bus, integration and test)
Phase A/B FY 2006, Phase C/D FY 2007-9, Launch CY 2009

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* **A White Paper submitted to the NRC Decadal Study**

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