ANDRILL Coulman High Planning

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Location of Proposed ANDRILL Coulman High Drillsites (near the Ross Ice Shelf edge, northeast of McMurdo Station)

Bathymetry modified from Davey (2004)
Iceberg C-19 Calves
Coulman High Project Planning Requirements

Coulman High Project

Radar Route Surveys
Seismic Data Acquisition & Processing
Riser & Drillbit Modeling

HWD System Tests
Current Meter Moorings
Deploy ROV; Upgrade & Development
Drilling System Modifications

Note: Blue = Planned survey tasks; Black = Pending discussion or further funding; Red = Non-survey-related activities.
CH Survey Site Locations for Moorings and Experiments
Proposed Oceanographic Mooring Design for CH Survey
Fig. 10. Spatial pattern of melting (cm a-1) over the base of the Ross Ice Shelf, averaged over the last year of the model run. Holland et al., 2003.
Figure 1.2: CDW intruding on shelf. Taken from Smethie and Jacobs (2005). Cartoon displaying circumpolar Deep Water intruding onto the shelf and mixing with Ice Shelf Water to form Bottom Water on the Ross Ice Front. AASW = Antarctic Surface Water, CDW = Circumpolar Deep Water, WRSSW = Western Ross Sea Surface Water, ISW = Ice Shelf Water, HSSW = High Salinity Shelf Water, LSSW = Low Salinity Shelf Water, AABW = Antarctic Bottom Water. Robinson (2009) MS Thesis, LSU.
**SCINI - 2009**

- 15 cm diameter 20 cm hole
- 300 meter depth limit
- Copper data transmission
- PVC couplers
- Video Ray aft thruster
- 500W power limit tether
- 6 cm tunnel thrusters

**Statistics:**
- 44 dives 144 hours no failures
- 3 units in inventory
- Utilized on other grants

**Deep - SCINI**

- 20 cm diameter 25 cm hole
- 1500 meter depth limit
- Fiber optic data transmission
- Syntactic foam couplers
- Gearless, counter rotating aft propellers
- 1500W power limit tether
- 9 cm tunnel thrusters

**Proposed New Features:**
- Multibeam bathymetric sonar
- Griper manipulator
- Micro Cat CTD
- Dynamic positioning
Drill to 500-600 m in 20 days
Then must ‘relocate’

~2m/day
(note that rate at MIS site was ~ 0.3m/day)
Drilling Through a Fast Moving Ice Shelf

- The challenge:
  - Ice shelf moving faster
  - Thicker ice shelf
  - Shallower water

- Two possible drilling strategies:
  - Fast drilling
  - Re-entry
Key Science Drivers:

1. Uncover the evolution and behavior of the West Antarctic Ice Sheet in a high CO₂ world (> 600 ppmv)

2. Constrain West Antarctic geography through time to improve ice sheet models
QUESTIONS?