GOALS OF THE THERMAL GRID PROGRAM

Sept 27 - Oct 8, 2000

1. **QUANTIFY THE THERMAL BUDGET OF CRUSTAL FORMATION,** [how much?]

2. **SPECIFICALLY, DETERMINE THE HEAT DISSAPATED AS DIFFUSE VENTS AND CONDUCTIVE HEAT FLUX,** [how?]

3. **DETERMINE THE PATTERNS OF CRUSTAL FLUID CIRCULATION.** [where?]

Paul Johnson, Susan Hautala,

Chris Jones, Maurice Tivey,

Matt Pruis, Irene Garcia-Berdeal,

Lisa G[illegible]

Tsurumi, Tomoko Kurakawa,

Phyllis Lam, Bill Tweddle,

JASON GROUP: Andy Bowen,

Matt Heinz, Will Sellers, Jon

Howland, Tom Crook, Bob Elder,

Steve Lerner, Mark Drewery,

Fran Taylor, Sarah Webster

and Dana Yoerger helped with the map

THERMAL GRID

METHODS

1. **IDENTIFY REGIONS OF DIFFUSE VENTING** [near bottom CTD & AST surveys]

2. **MEASURE VERTICAL HEAT FLUX IN THESE AREAS** [MAVs and thermal blanket]

3. **INVERT THE SURFACE EXPRESSION OF HEAT FLUX TO CONSTRAIN SUB-SURFACE CIRCULATION PATTERNS.**

JASON NEAR-BOTTOM SURVEY OF ENDEAVOUR AXIAL VALLEY

area: 3500 meters by 650 meters
20 m altitude: 50 m line spacing

SM2000 (high resolution bathymetry and acoustic scintillation to find diffuse vents)

TWO CTDs (as vertical gradiometer)

magnetometer

particulate flux (backscatter and transmission)

dissolved oxygen

INSTRUMENTS DEPLOYED (for 12 months)

1. **MAVs current meters and thermistor strings (8)**

2. **Seafloor magnetometer and tiltmeters (4)**

3. **Thermal Blanket (1)**

4. **High Temperature HOBOS (2: at Milli-Q and Clam Bed)**

5. **Low Temperature HOBOS (8)**

SECOND LEG OF THERMAL GRID IS 13 JUNE to 3 JULY, 2001

[now, all we need is an earthquake…]

Recommendation for Equipment Modification for JASON II

- Evaluate impact of integrating bottom track XYZ velocities in topside code for JASON auto X-Y control system (instead of using displacements) .

- Assuming quality of positioning information does not degrade, modify software so that existing RDI ADCP can be used in a mode (e.g., PDO) which collects water column velocity data as well as bottom-track velocity data.

Reasons:

- Cost-effective enhancement of measurement capability

- Velocity data would be useful for existing operations
  -Finding location of sources of thermal anomalies or "smoke"
  -Deciding in-situ instrument location and/or orientation
  -Establishing best direction of approach to high temperature vents

- With water velocity measurement capability, a number of new questions could be explored
  - Simultaneous mapping of property and velocity fields
  - Assessing near field differences at given locations from moorings measuring larger scale flow
  - Timeseries studies of property (acoustic scintillation, temperature, salinity, particle concentration, etc.) variation with local tidal flow
  - Mapping of near bottom (to 30 m.a.b.) flow environment in mean and on tidal timescales.
  - Alteration of near bottom flow by high temperature sources ("the entrainment problem")