



Australian Government

Geoscience Australia

Proposed SCAR Action Group on Cold Seeps and Hydrothermal Vents

Proponent:

Phil O'Brien

Contributions from Keith Martin-Smith, Andrew Jones

Internal recommendation

2. Concerning SCAR Action group on Cold Seeps and Hydrothermal vents in the Antarctic

This Action Group will identify areas within the CCAMLR region likely to contain Vulnerable Marine Ecosystems around cold seeps and hydrothermal vents to assist in their management. It is proposed in response to CCAMLR Conservation Measure 22-06.

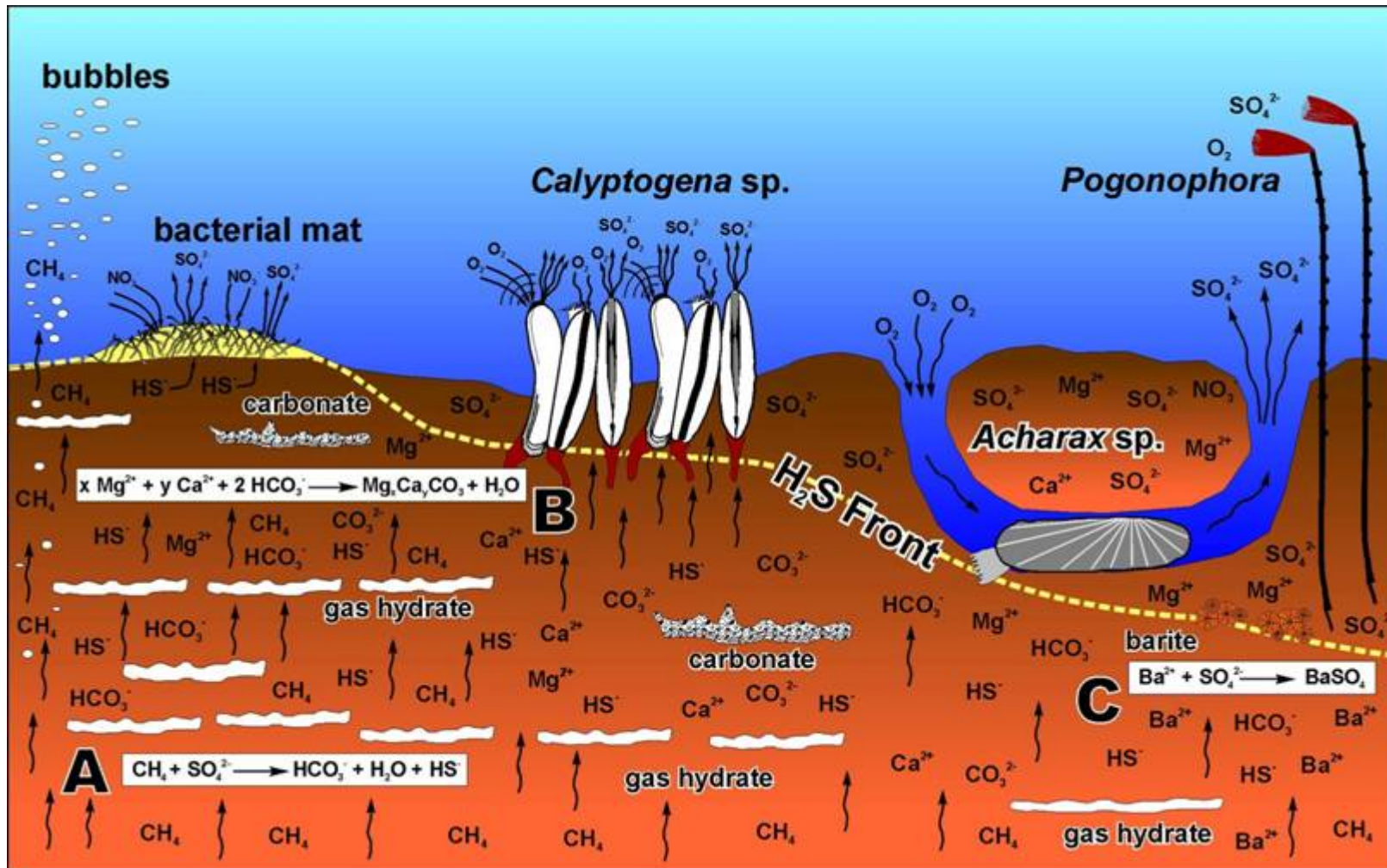
***Recommend* that SCAR approve the establishment of an Action Group on “Cold Seeps and Hydrothermal vents in the Antarctic” jointly with the Standing Scientific Group on Life Sciences**

CCAMLR Conservation Measure 22-06

Calls for the protection of Vulnerable Marine Ecosystems:

- Seamounts
- Cold seeps
- Hydrothermal vents
- Coral communities
- Sponge communities

A Seep



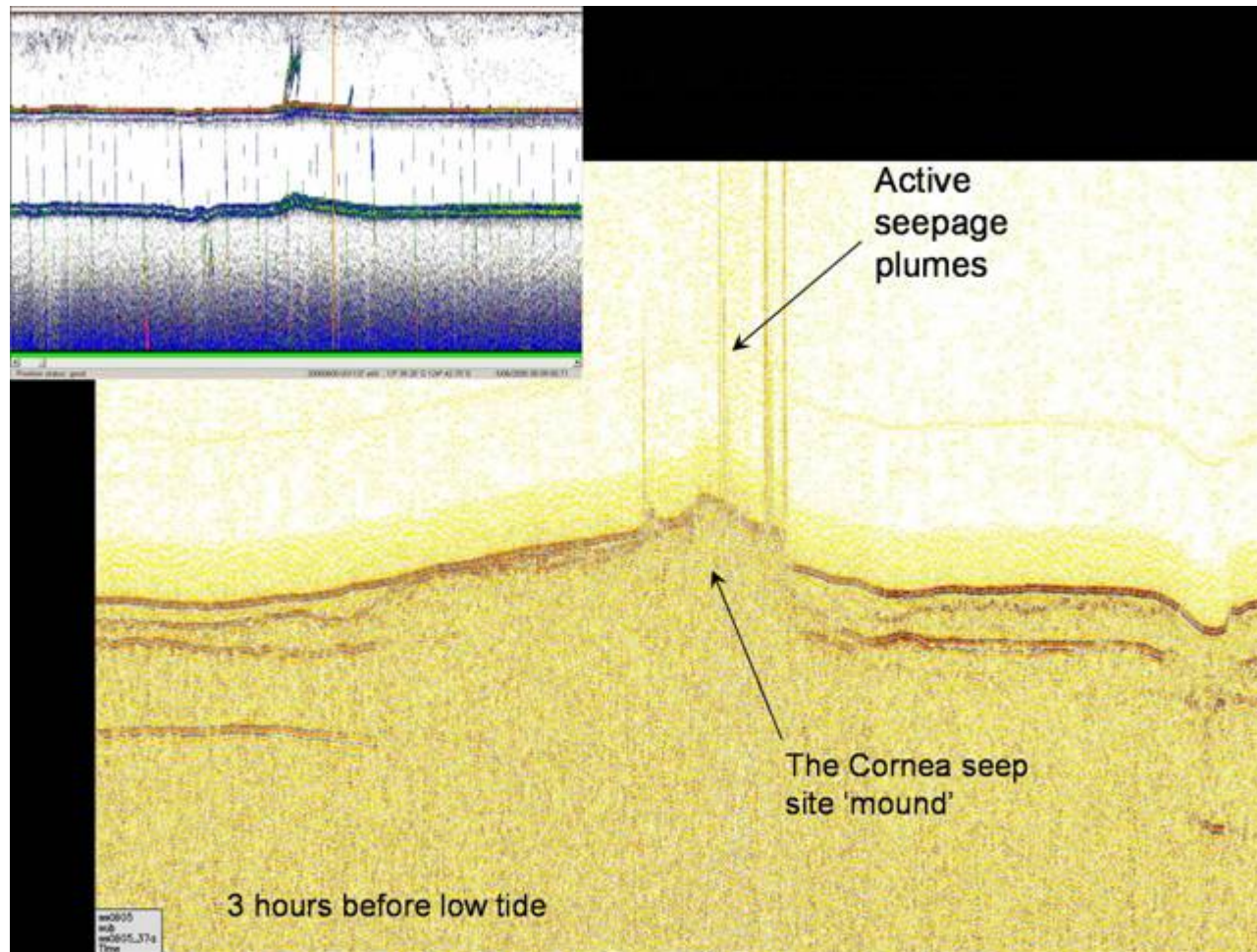
Scheme of a typical methane-dominated cold seep site:

A: anaerobic oxidation of methane (AOM)

B: carbonate formation due to the alkalinity increase from AOM

C: barite formation caused by the mixing of Ba and SO_4 -rich water

Seeps and vents are detectable on: seismic



Echosounder records

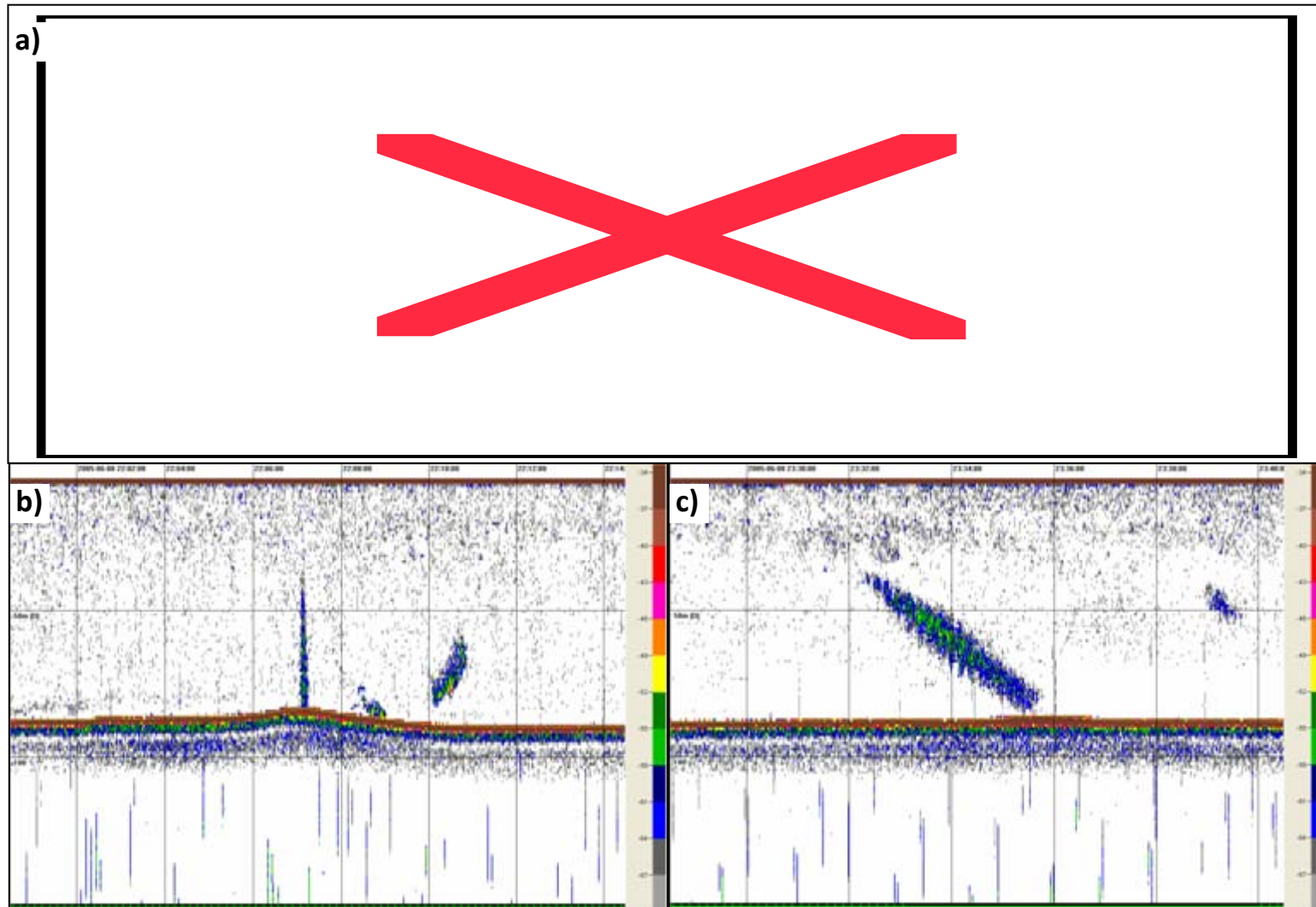


Figure 50 120 kHz echograms from SS06/2005 showing a variety of gas flare morphologies from the Yampi Shelf. a) shows a large mass, b) illustrates a vertical flare, c) images a flare inclined in the direction of tidal current flow.

Sidescan sonar records

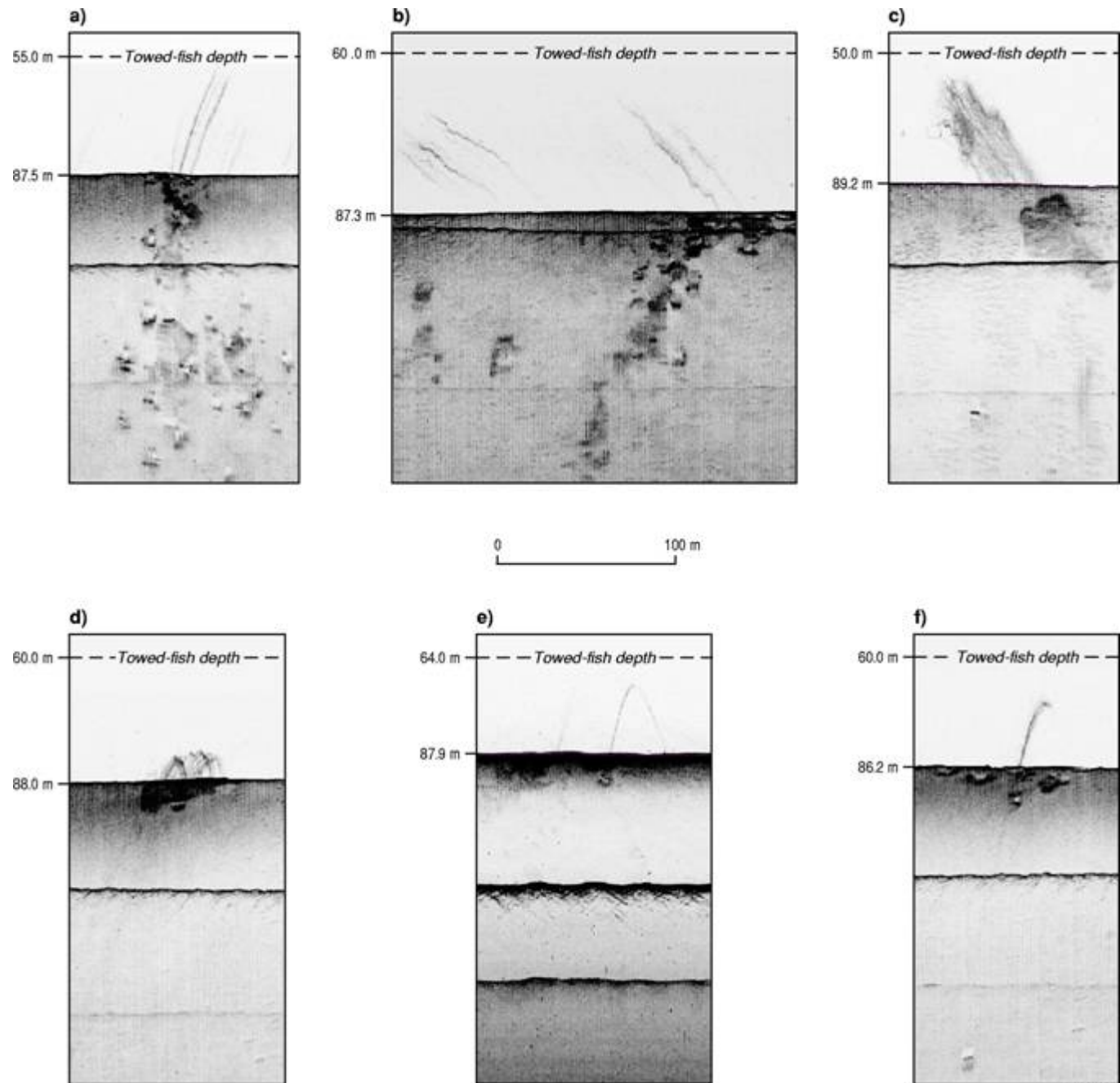
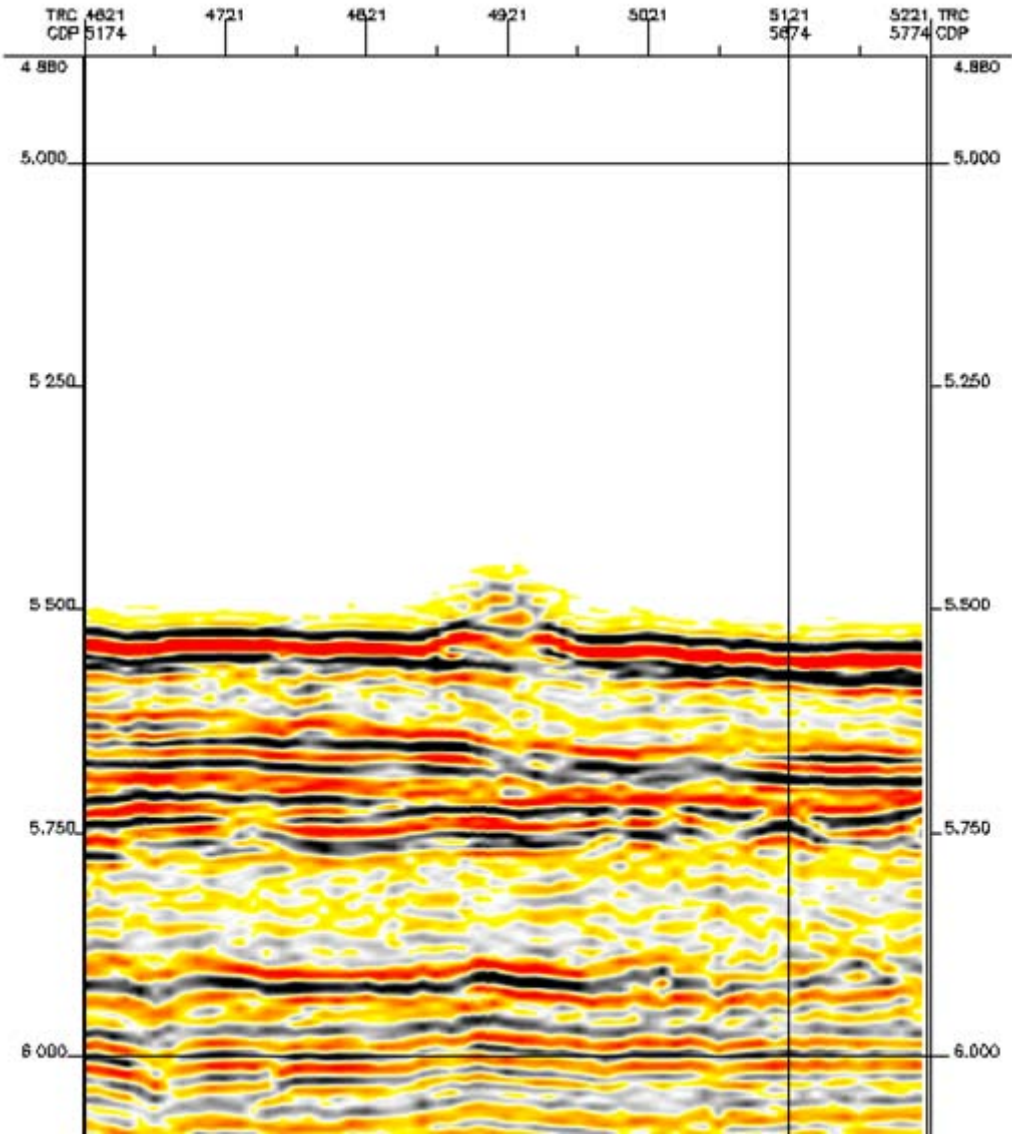


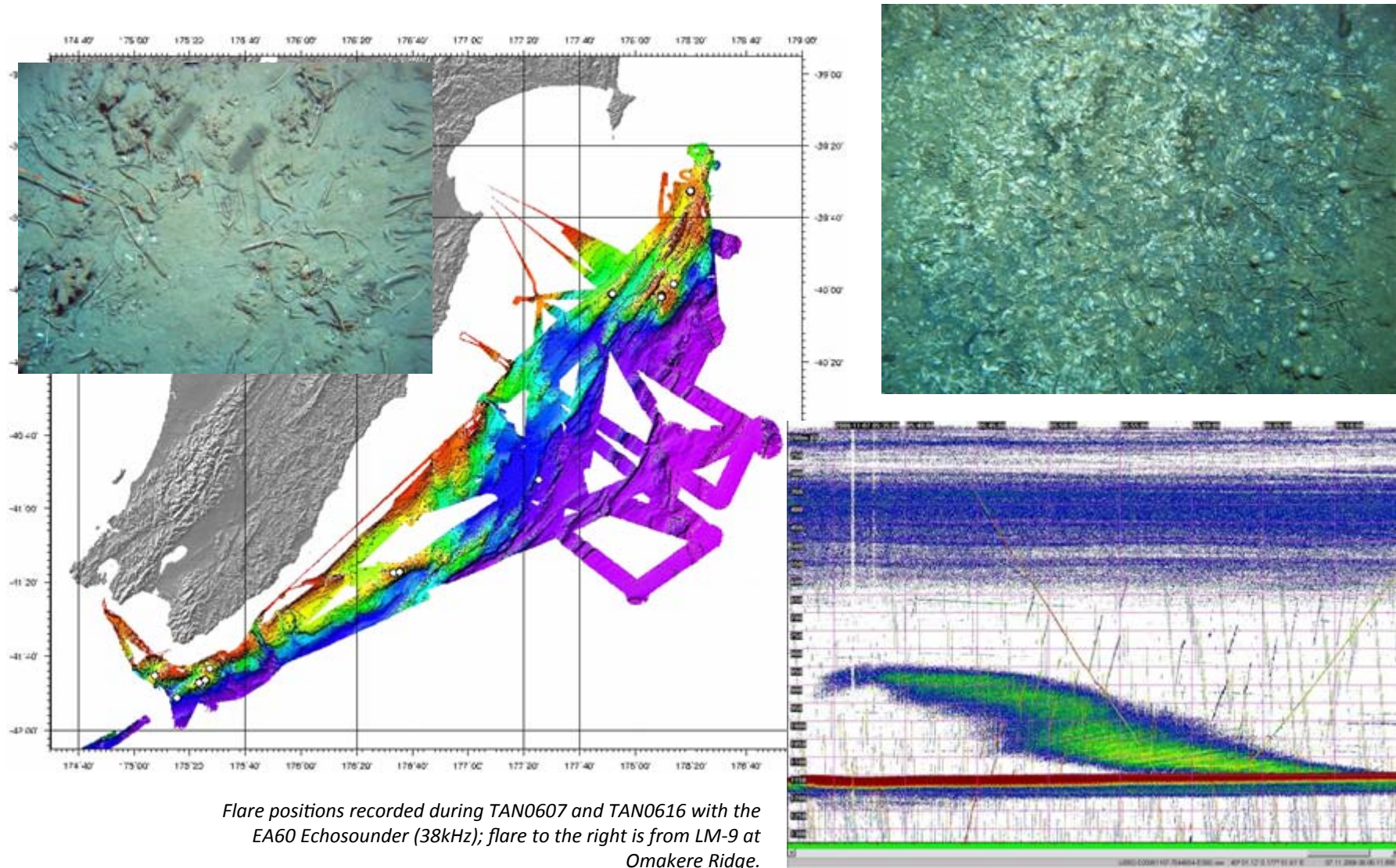
Figure 52 Side-scan sonar data illustrating gas flares into the water column from the Yampi Shelf. a-c) linear flares are sloping upward in the direction of the tidal current, up to a layer between 60 and 40 m depth, which was observed on the ship's echosounder d-e) hyperbolic-shaped plumes are reaching up to 20 m above the seafloor.

Multichannel Seismic



Possible mud volcano
Wilkes Land margin

Confirmed identification of seep and vent communities requires multidisciplinary approach...geology, geophysics, biology



Flare positions recorded during TAN0607 and TAN0616 with the EA60 Echosounder (38kHz); flare to the right is from LM-9 at Omakere Ridge.

Action group outputs:

1. Guides on recognition of seeps and vents including levels of certainty for different indicators and data sets.
2. Field guide to seep and vent organisms
3. Review of existing data to provide CCAMLR with GIS of areas of confirmed, probably and possible seeps and hydrothermal vents.
4. Science papers arising from 1, 2 and 3.
5. Advice to CCAMLR arising from 1, 2 and 3.

Work plan:

- Workshop to develop field guides and recognition guidelines late 2008-early 2009
- Guides to CCAMLR late 2009
- Regional working groups review data 2009-2010
- GIS data progressively delivered to CCAMLR

- **Seeps and Vents Action Group (SAVANT – Seeps and Vents ANTArctica)**
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- The Seeps and Vents Action Group started at SCAR 30 in St Petersburg.
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- **The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) has been charged with developing management practices for Vulnerable Marine Ecosystems (VMEs) in Antarctic waters. The VMEs identified as having a high priority by CCAMLR (Conservation Measure 22-06) are:**
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 - Biological communities associated with seamounts, cold seeps and hydrothermal vents, Cold water coral and sponge communities
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 - Mapping of seamounts is a fairly straightforward exercise that can be accomplished using global data sets such as satellite gravity, for seamounts over a certain size and compilations of ship-based bathymetry. These activities are underway under the auspices of International Bathymetric Chart of the Southern Ocean Project. Accurate location of cold seep and hydrothermal vent communities is more difficult and will require protocols using a range of ship-based techniques. However, existing geophysical data can be used to identify areas more likely to contain such features.
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 - To assist CCAMLR, the SCAR Geoscience and Life Science SSGs have started an Action Group that aims to identify areas within the CCAMLR region likely to contain Vulnerable Marine Ecosystems around cold seeps and hydrothermal vents. The coordinator is Philip O’Brien of Geoscience Australia.

- The Action Group aims to:
- Compile a guide for the identification of fluid escape features to assist in the detection of possible seep sites.
- Compile a guide for the identification of cold seep and hydrothermal vent organisms.
- Review seismic reflection data to detect possible areas of shallow and leaking gas.
- Review echo sounder data for evidences of possible gas flares from active vents
- Review multibeam and sidescan data for evidence of fluid escape structures on the sea floor
- Review biological data for evidence of organisms associated with cold seeps or hydrothermal vents
- Provide locations of areas of possible fluid seepage and biological communities to CCAMLR for incorporation in a GIS.

Activities so far include contacting potential participants, particularly those involved in research into seeps and hydrothermal vents. A number of people already involved in programs such as ChEss (Biogeography of Deep-water Chemosynthetic Ecosystems) have expressed interest. A pilot study reviewing echo sounder data for evidence of gas flares in the water column has also started.

- The Action Group Coordinator's address is:
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