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# LADDER: Welcome to the LADDER Project web site

## What is LADDER all about?

LADDER stands for LArval Dispersal on the Deep East Pacific Rise. It is an interdisciplinary research project investigating larval dispersal and physical oceanography at a mid-ocean ridge. The Principal Investigators are Lauren Mullineaux (WHOI), Andreas Thurnherr (LDEO), Jim Ledwell (WHOI), Dennis McGillicuddy (WHOI) and Bill Lavelle (NOAA/PMEL). The project is funded by NSF Grant OCE-0424953. ( View Proposal)

The primary objective of the LADDER project is to investigate oceanographic and topographic influences on larval retention and dispersal in hydrothermal vent communities. The focus is on processes occurring on relatively short spatial O(10-100km) and temporal O(1month) scales, corresponding roughly to invertebrate larval life spans. In addition to the primary ecological goals, the LADDER project also addresses issues of interest to the physical oceanography community, in particular horizontal and vertical dispersal (both advective and eddy diffusive) near the ridge crest.

The specific questions we are asking include:

1) What are the influences of advection and eddy diffusion on the maximal dispersal distance of vent species with given larval life spans?

2) How do the flows influence the probability of a larva being retained at or returned to its natal site?

3) What are the effects of ontogenetic changes in larval behavior (i.e., vertical positioning) on species' retention or dispersal distances?

4) How are the probabilities that larvae will be lost from the ridge system influenced by topography and flow? Might the axial summit trough inhibit off-axis transport of larvae, and serve as a conduit between habitable vent sites?

5) What are the mean and temporally varying flows in the vicinity of a mid-ocean ridge crest, and what is their spatial structure and coherence?

6) What is the magnitude of the diapycnal diffusivity near the ridge crest?

7) How rapid is lateral dispersion, and how effective is lateral homogenization by eddy diffusion near the ridge crest?

Enlarge Image

Glass floats ready for deployment on LADDER-2 cruise (photo by S. Mills)

Enlarge Image

The Deep-Sea tracer injection system, mounted on submersible Alvin, and flanked by proud inventors Jim Ledwell, Brian Guest and Ryan Jackson (Photo by L. Mullineaux)

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