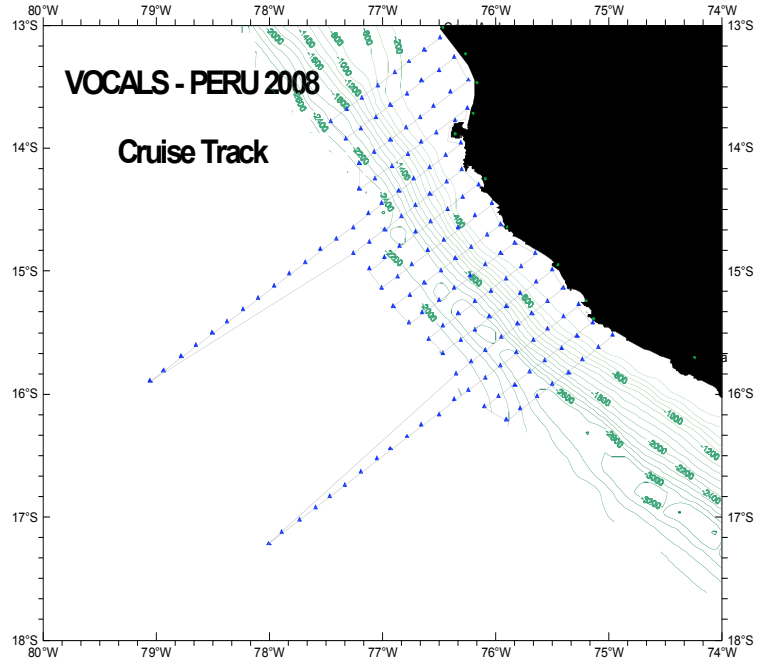
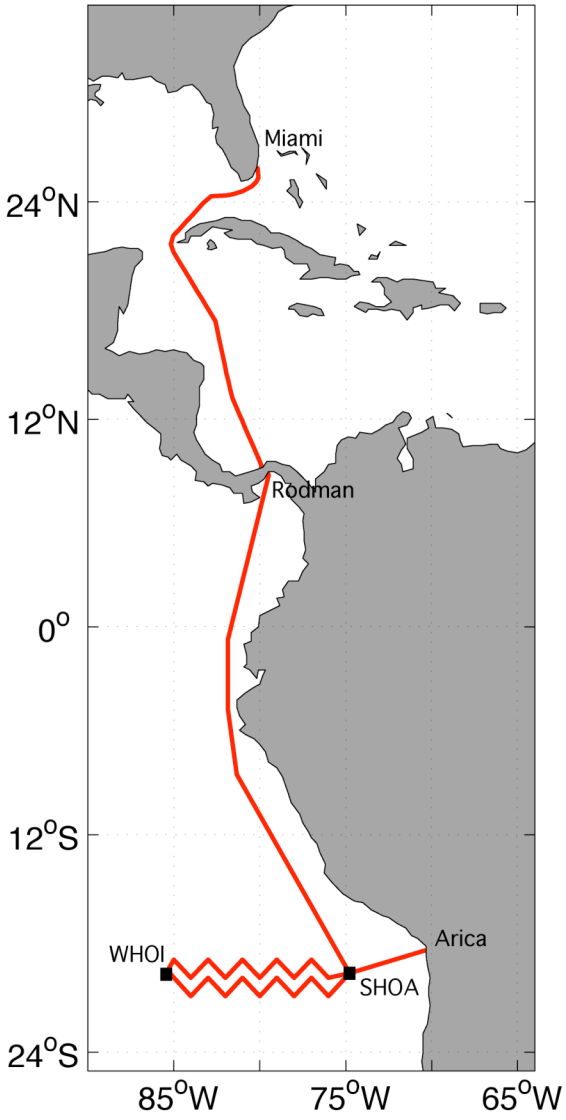
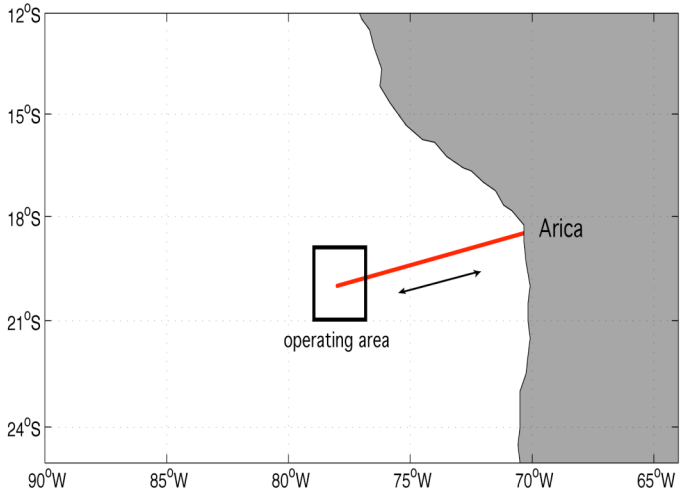
VOCALS REx: Ships



Oct 2- Nov 3, 2008
Leg 1 VOCALS R H Brown



Nov 6- Nov 29, 2008
Leg 2 VOCALS R H Brown



VOCALS Peru Cruise track- Cr. Olaya 2008/10

On station within operating area, exact location determined based on Leg 1 survey.

VOCALS REx: *Olaya*

Main Objective and Hypothesis

The main objective of the Peru VOCALS Coastal Component is to investigate the meso and submesoscale ocean-atmosphere interaction in the upwelling cell off southern Peru (Pisco-San Juan) and to determine the associated biogeochemical responses. Two main hypotheses are considered:

- There is a strong feedback/ interaction between the variability of the atmospheric coastal wind, the upwelling cell and the instabilities of the associated thermic front and cloud clearing between Pisco-San Juan.

- Mesoscale eddies play an important role in the transport of coastal upwelled water properties to offshore regions.

Observation of the upwelling plume and front by a glider (magenta line). (Color shaded corresponds to SST observed in February of 2007, the Peru VOCALS cruise is indicated by blue lines).

VOCALS REx: *Olaya*

Specific questions and Approaches

This project address (through modeling and from the available observations) **specific questions** that are believed to be relevant to the understanding of the variability in the Pisco-San Juan region. These are:

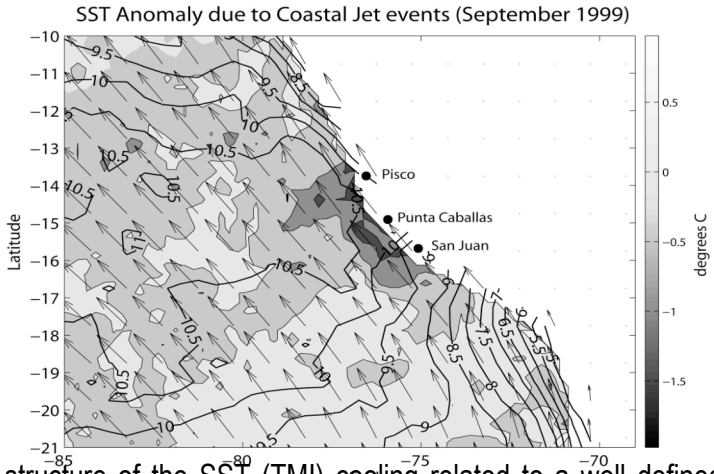
SQ1. Spatial structure of the low-level atmospheric circulation (15°S)

SQ2. Quasi-permanent coastal clearing (~15ºS)

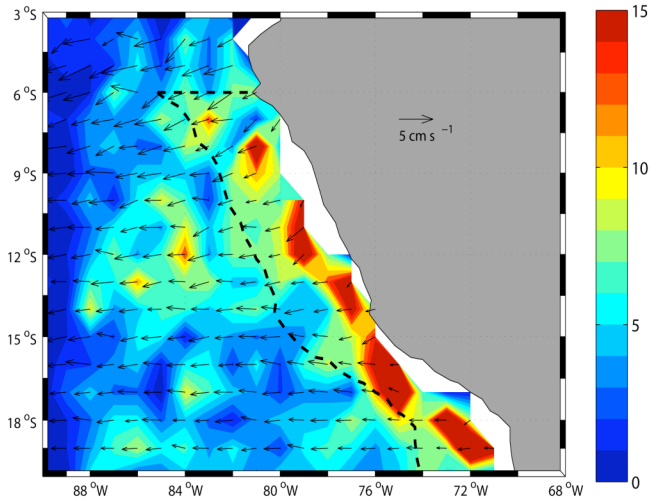
SQ3. Strongest coastal upwelling and eddy activity

SQ4. Coastal Jet events and their impacts on the vertical oceanic variability

SQ5. 4-D Structure of mesoscale features and related cross-shore transports



Spatial structure of the SST (TMI) cooling related to a well defined CJ (about 7 days) which occurs at the beginning of September 1999 [Renault, et al, 2007].

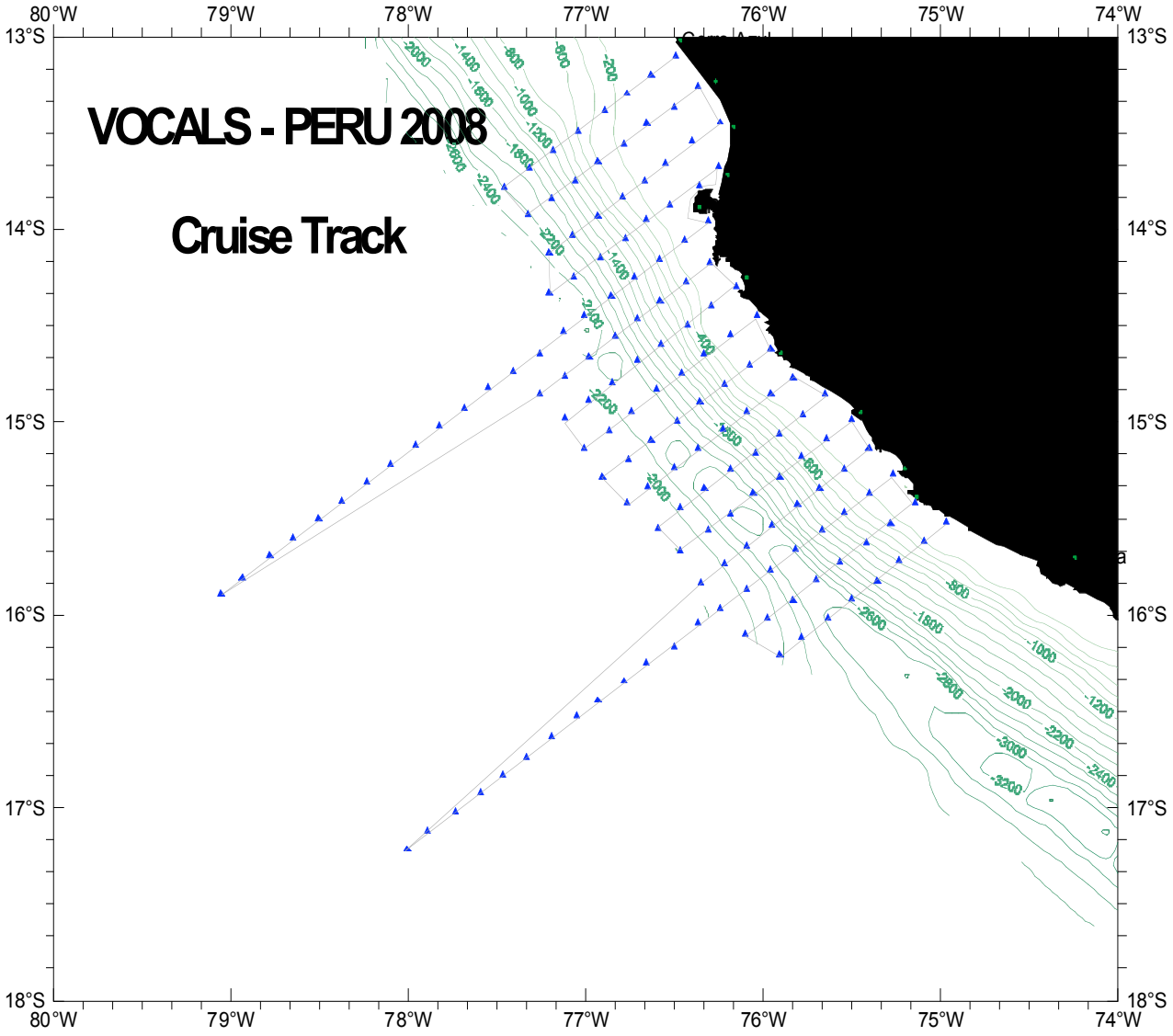


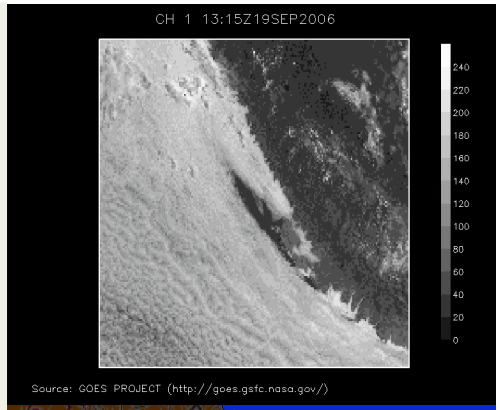
Mean regional climatology of eddy genesis occurrence for the time period October 1992-August 2006 [Chaigneau, et al, 2007, submitted].

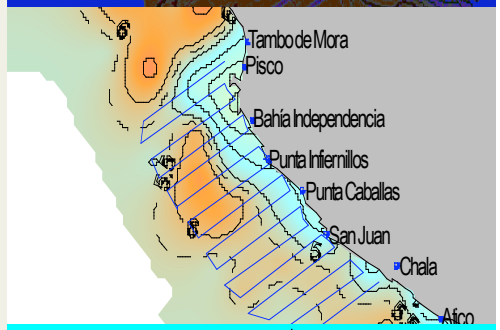
VOCALS REx: *Olaya*

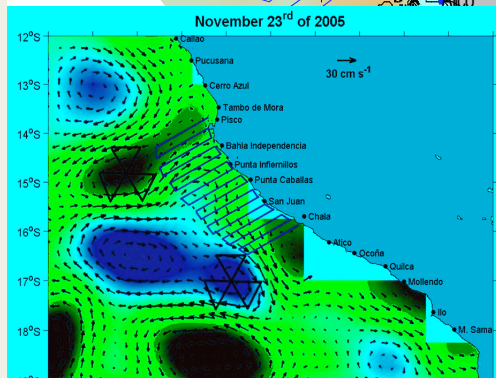
ATMOSPHERIC	In land	Surface measurement	Ta, Humidity, SLP, Wind speed/direction, Cloudiness (cloud cover, types), Weather conditions
		Vertical profile	Ta, Humidity, Pressure, Wind speed/direction
	On cruise	Surface measurement	Ta, Humidity, SLP, Wind sp eed/direction, Cloudiness (cloud cover, types), Long /Short Wave Radiation, Weather conditions
OCEANOGRAPHIC & BIOGEOCHEMISTRY COMPONENTS	Coastal stations	Surface measurement	SST, SSS, O_2, Phyto & Zooplankton
		Vertical profile	Ta, Humidity, Pressure, Wind speed/direction
	On cruise	Surface measurement	Tw, Salinity, Horizontal Velocities, O_2, Fluorescense, Chlor -a, pCO_2 Nutrients (NO_3, PO_4, SiO_3, SiO_4), Phyto & Zooplancton (eggs -larvae)
		Vertical profile	Tw, Salinity, Vertical Velocities O_2, Fluo rescense, Chl or-a, pCO_2 Nutrients (NO_3, PO_4, SiO_3, SiO_4), Phytoplankton, Zooplancton (eggs -larvae)
FISHERY RESOURCES	Acoustic measurements		Ecotraces of fish distribution and abundance, zooplancton
	Laboratory Analysis		Post processing of acoustic data If trawl sampling: fish biology and stomach content analysis

VOCALS REx: *Olaya*









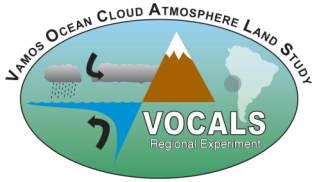
VOCALS REx: *R H Brown* Leg 1

Oct 2	Depart Miami
Oct 7	Arrive Colon, people xfer
Oct 7	Night transit Panama Canal
Oct 14	Arrive SHOA buoy, begin survey
Oct 18	Arrive WHOI buoy
Oct 18-24	Buoy deploy, recover Buoy-ship comparisons Sampling
Oct 24	Begin survey to east
Oct 27	Arrive SHOA buoy
Oct 27-Nov 2	Buoy recover, deploy Buoy-ship comparisons Sampling
Nov 2	Underway to Arica
Nov 3	Arrive Arica

VOCALS REx: *R H Brown* Leg 1

Oct 2	Depart Miami, no station time sampling in US, intl waters, testing; met obs; MAERI? no clearance requests for Cuba, Central America
Oct 10	Arrive Ecuadorian waters, clearance will be requested,no station time
Oct 12	Arrive Peruvian waters, clearance will be requested, no station time
Oct 14	Arrive SHOA buoy, begin survey, International waters, no station time
Oct 18	Arrive WHOI buoy, 6 days on station
Oct 24-27	Underway survey, no station time
Oct 27	Arrive SHOA buoy, 6 days station time
Nov 2	Underway to Arica, enter Chilean waters, clearance will be requested
Nov 3	Arrive Arica

VOCALS REx: *R H Brown* Leg 1



Research groups:

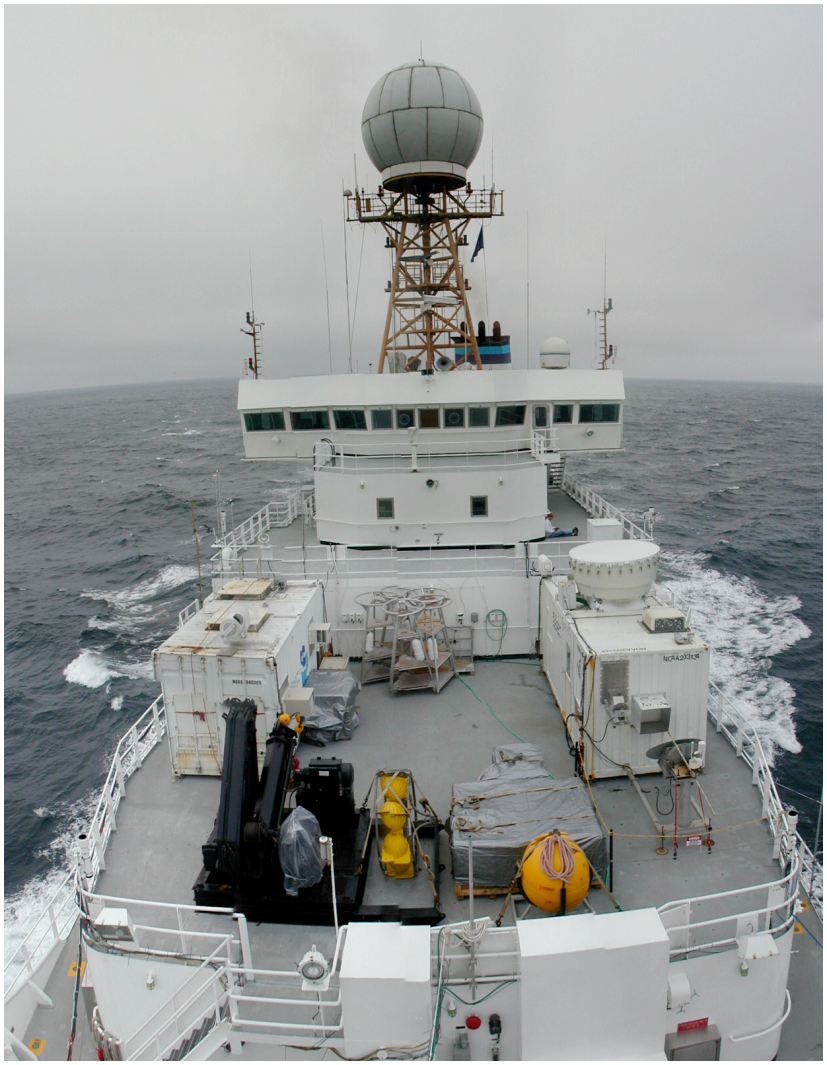
- WHOI Weller/Straneo – moorings, UCTD, Argo Floats, drifters
- LDEO/WHOI Zappa/Farra – moored instrumentation
- PMEL – Sabine, moored PCO_2
- INOCAR - Ecuadorian Navy Inst of Oceanography
- IMARPE – Inst for Marine Research, Peru
- SHOA – Chilean Navy Hydrographic and Ocean. Service, DART mooring
- NOAA ESRL Fairall - air-sea fluxes, radiosondes, cloud opt. properties
- NOAA ESRL Brewer – scan Doppler LIDAR
- NOAA ESRL Feingold – lidar-cloud radar aerosol-LWP
- NCSU – Yuter – C-band radar, drizzle
- U Miami – Albrecht, cloud drizzle/aerosol interactions
- U Miami – Minnett radiometric SST
- Bigelow – Matrai, DMS production
- U Washington/NOAA PMEL/SIO – Covert/Bates, aerosols
- CU – Volkamer, atmos. Chemistry
- UH Huebert – DMS flux
- PMEL – underway DMS
- NOAA- Teacher-at-Sea

Heavy equipment:

- Mooring winch, anchors, and related
- 7 Vans: 1) Albrecht/Miami; 2) PMEL1/Aerosol/Chem; 3) PMEL2/Aerosol/Phys; 4) PMEL3/Chem; 5) PMEL4/spares; 6) WHOI/mooring; 7) ESRL/lower atmos
- Radiosondes/helium
- Instruments on upper decks

Observation Systems

Air-sea Fluxes, Clouds, Precipitation



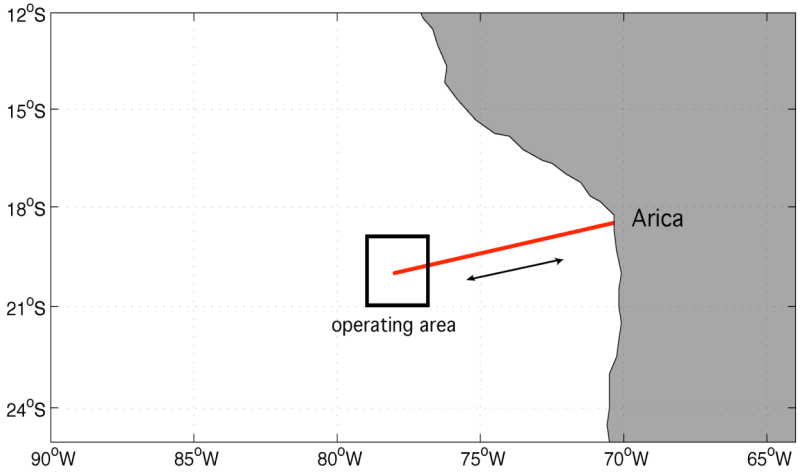
Cloud Radar and Microwave Radiometer

VOCALS REx: *R H Brown*
Leg 2

Nov 3-6	In port in Arica, meet with A/C investigators, decide on target mesoscale feature(s); unload mooring equipment and recovered mooring hardware; people on/off

Nov 6	Depart Arica
Nov 8	On station, nominal target (20°S, 78°W)
Nov 27	Depart for Arica
Nov 29	Arrive Arica
Nov 29-30	Unload

Leg 2 VOCALS R H Brown



On station within operating area, exact location determined based on Leg 1 survey.

VOCALS REx: *R H Brown* Leg 2

Research groups:

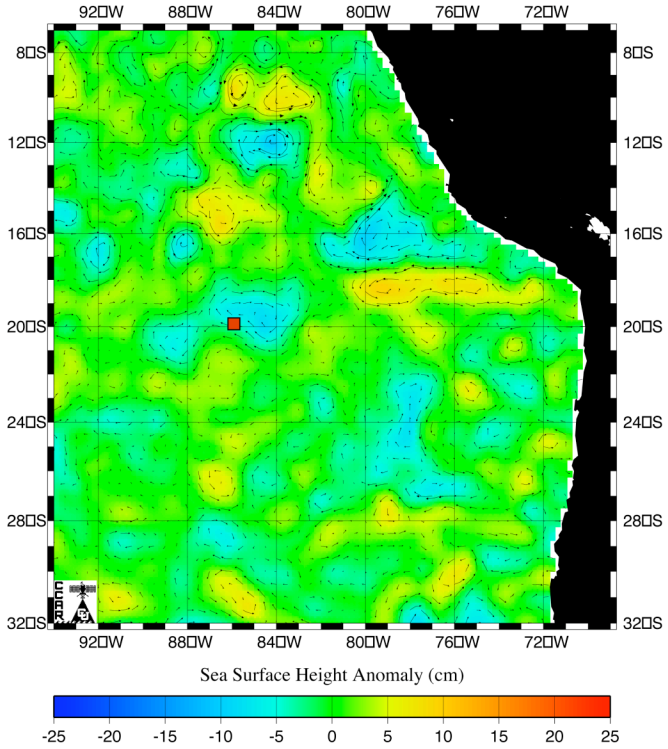
- NOAA ESRL Fairall - air-sea fluxes, radiosondes, cloud opt properties
- INOCAR - Ecuadorian Navy Inst of Oceanography
- IMARPE – Inst for Marine Research, Peru
- NOAA ESRL Brewer – scan Doppler LIDAR
- NOAA ESRL Feingold – lidar-cloud radar aerosol-LWP
- NCSU – Yuter – C-band radar, drizzle
- U Miami – Albrecht, cloud drizzle/aerosol interactions
- U Miami – Minnett radiometric SST
- Bigelow – Matrai, DMS production
- U Washington/NOAA PMEL/SIO – Covert/Bates, aerosols
- CU – Volkamer, atmos. Chemistry
- UH Huebert – DMS flux
- PMEL – underway DMS
- NOAA- Teacher-at-Sea

Heavy equipment:

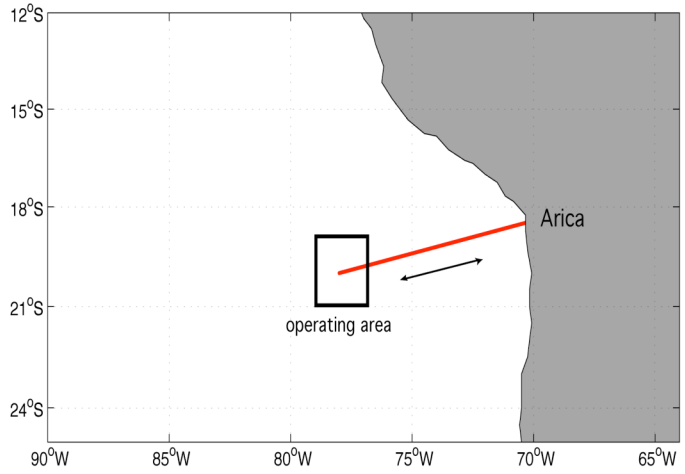
- 7 Vans: 1) Albrecht/Miami; 2) PMEL1/Aerosol/Chem; 3) PMEL2/Aerosol/Phys; 4) PMEL3/Chem; 5) PMEL4/spares; 6) WHOI/mooring; 7) ESRL/lower atmos
- Radiosondes/helium
- Instruments on upper decks

VOCALS REx: *R H Brown* Leg 2

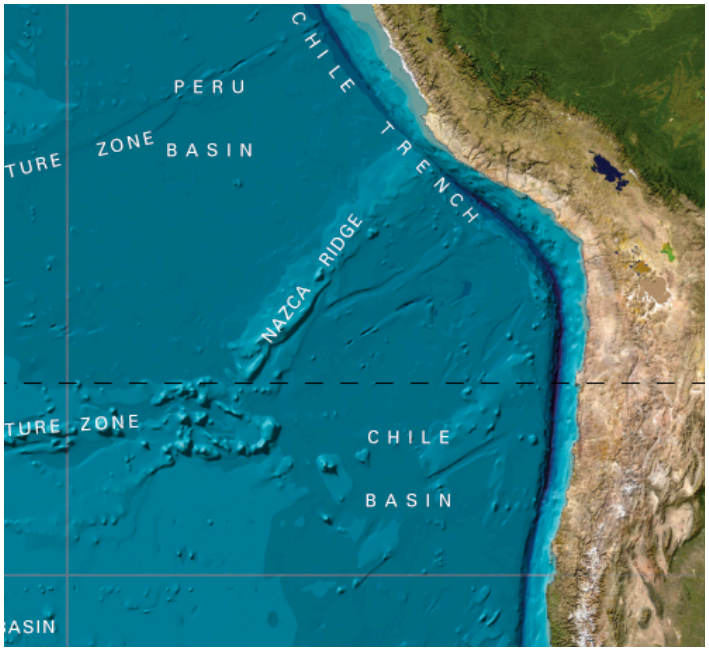
Historical Mesoscale Altimetry - Mar 17, 1998



Leg 2 VOCALS R H Brown



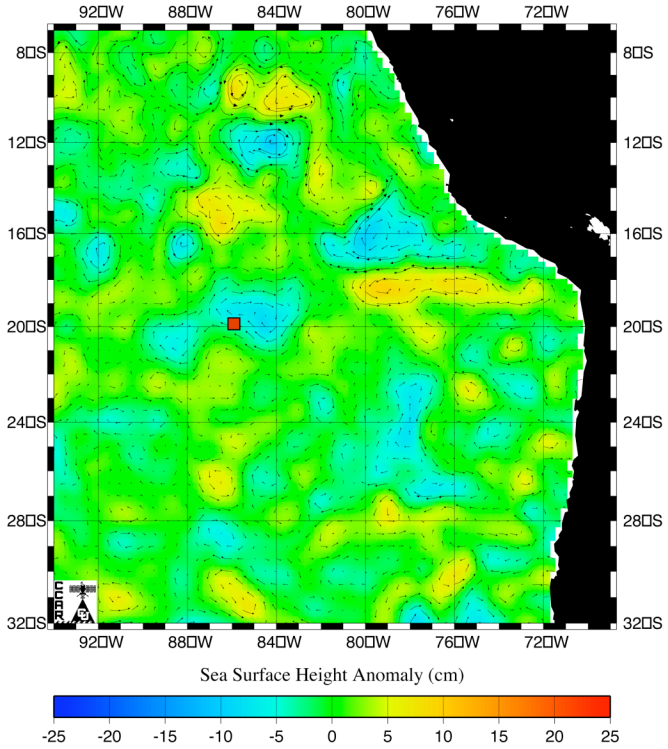
On station within operating area, exact location determined based on Leg 1 survey.



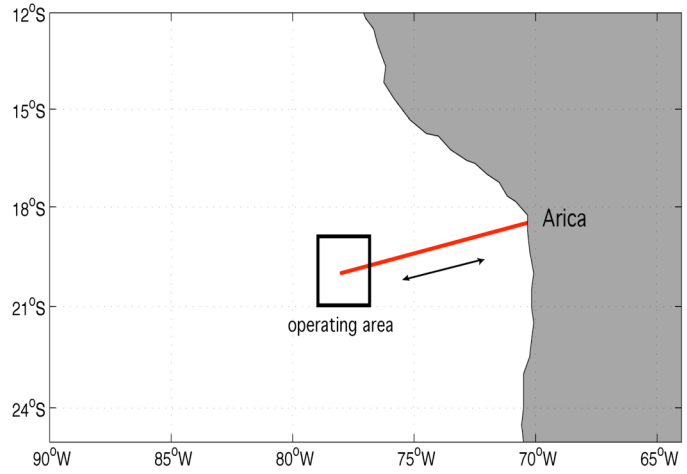
Nov 6	Depart Arica
Nov 8	On station, nominal target (20°S, 78°W)
Nov 27	Depart for Arica
Nov 29	Arrive Arica
Nov 29-30	Unload (How much?)

VOCALS REx: *R H Brown* Leg 2

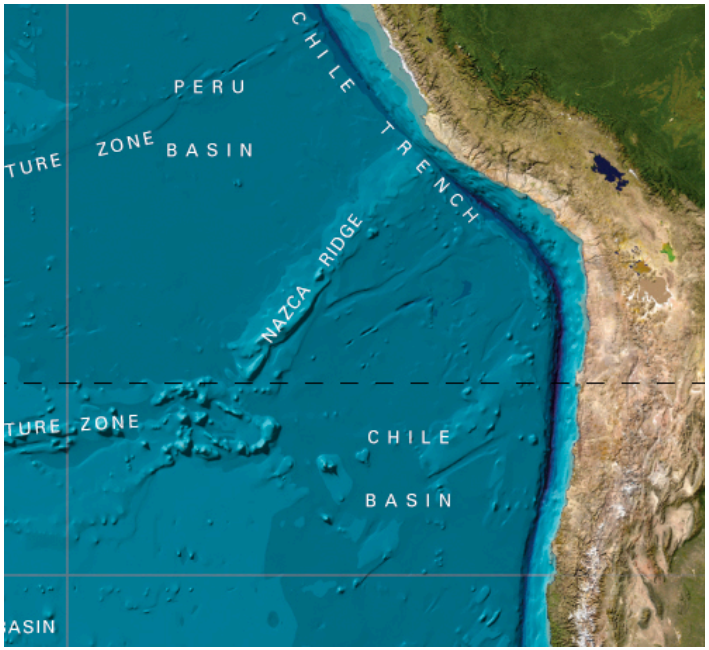
Historical Mesoscale Altimetry - Mar 17, 1998



Leg 2 VOCALS R H Brown



On station within operating area, exact location determined based on Leg 1 survey.



Nov 8-27 On station, nominal target (20°S, 78°W)

One station? Where? East of Nazca Ridge?
West of Nazaca Ridge, near long term site?
How much work with A/C?