A History of VOCALS

We made it!

As told by a Survivor

(so far...)

Arica, Chile, November 2008
And at the beginning (late 90’s) there was EPIC

- EPIC was a joint program of the Pan American and Pacific panels of US CLIVAR funded through NSF and NOAA, and a contribution to VAMOS and international Pacific CLIVAR.

- The overall goal was to observe and understand the feedbacks between the atmosphere and upper ocean in the Eastern Pacific cold tongue/ITCZ region and the SE Pacific stratocumulus cloud regime.

- EPIC had three components: 1) enhanced monitoring and empirical studies, 2) EPIC 2001, and 3) model testing and improvement.
EPIC started in PACS, which also set the stage for VAMOS

The World in VPM1

High priority regions for VAMOS ocean-atmosphere field programmes.

CTIC, STR, TAV, SACZ and WP refer respectively to the cold-tongue/ITCZ, eastern Pacific stratus regime, tropical Atlantic variability region, South Atlantic Convergence Zone, and Interamerican warm pool region. Arrows indicate hypothesized interactions with other regions.

Steve Esbensen, April, 1998
The Pioneers

B. Albrecht (Chair), Rene Garreaud, David Rogers, Pepe Rutllant, Hector Soldi, Bob Weller

Bruce Albrecht
The Veteran Chilean Warrior: Jose Rutllant

Regional Support was Outstanding

Later to be joined by powerful Peruvian Ladies Carmen Grados
VPM2 - VPM3 - VPM4

• VPM2, in Mar 99, decided to develop a VAMOS Stratus/Stratocumulus Field Programme (MASC).

• One year later, VPM3 decided to expand membership of the VAMOS Stratus/Stratocumulus Working Group by recruiting a 'Blue ocean' oceanographer and a large-scale modeller. VPM3 also decided to develop a better acronym for MASC.

• In 2001, at VPM4, MASC became the VAMOS East Pacific Investigation of Climate (VEPIC), and a new leader emerged.
The new leader and partners

Chris Bretherton*
Ben Felzer*
Rene Garreaud
Pablo Lagos
José Meitin*
Rodrigo Núñez
José Rullant*
Steve Esbensen
Björn Stevens*
C. Roberto Mechoso*
Pedro Silva Dias*

* Participated in part of the meeting.
* Co-Chairs
* Rapporteur
VEPIC in VPM4

Enhanced Monitoring and Pilot Studies Designed to Capitalize on Unique Physical & Infrastructural Features of South East Pacific Stratus Region On Diurnal and Longer Timescales.
VEPIC in VPM4

• **VAMOS-EPIC:** A joint effort of VAMOS and International Pacific CLIVAR (Pan American and Pacific groups), currently in its planning stages.

• **Science focus:** Interaction between climate over South America and low cloud/circulation over the SE Pacific on all timescales: a) diurnal (coastal/mountain circulations), b) synoptic (coastally trapped waves; Altiplano convection), c) seasonal (feedbacks with monsoon), d) interannual variability (ENSO).

• **Motivation:** Low clouds, sharp topography, and deep convection are all serious global and NWP modeling problems.
VEPIC – Scientific Goals

- Drizzle – Entrainment & Cloud Liquid Water Path.
- Upper Ocean Coupling & Feedbacks and their relation to ENSO.
- Comparative Climatology.
- Aerosol Effects & Characterization in Marine Boundary Layer (MBL).

VEPIC – Modelling

- Simple model interpretative studies.
- Evaluation of ECMWF and NCEP column data.
- Satellite product evaluation and synthesis.
- Climate model evaluation.
VEPIC – Infrastructure

- Extensive Buoy Array.
- Coastal Meteorological Network.
- San Felix Island.
- Regional Interest.

Timeline

- Installation of Instrumentation on San Felix Island (July 2002).
- Possible intensive field phase Oct-2005 (or 2006).
- VEPIC panel will meet at VPM5.
Chile and Peru, Great Partners

National and Regional Initiatives
VEPIC in VPM5, with reinforcements...

- Tropical ocean variability
  - Impact over land
    - (moisture fluxes from ocean)

- PIRATA
- ITCZ
- LLJ
- LBA
- VEPIC
- SACZ
- PBL
  - Land surface parameter
    - Convection
    - Aerosols

- Land-Atmosphere-Ocean links
  - (stratocumulus-convection)

- LLJ
  - Moisture fluxes
  - Soil processes

- PLATIN
  - Predictability of climate and hydrology variability
  - Societal impacts of climate change

- 2001
JOSE MEITIN PROVIDES NCAR/EOL FIREPOWER
Chris Fairall brings his Field Experience.

(Note the big finger)
VPM5 and VPM6: VOCALS is Born and is Endorsed - Scientific Issues

- Time and space scales of Cloud-Topped Boundary Layer (CTBL) - continent interaction.
- Regional seasonal/interannual feedbacks between stratocumulus clouds, surface winds, upwelling, coastal currents and SST in the Eastern Pacific.
- Feedbacks of Eastern Pacific cloud topped boundary layer properties on overall tropical circulation and ENSO.
- Climatic importance of aerosol-cloud interactions.
**VOCALS short-term implementation**

- Augment San Felix Island instrumentation with wind profiler, radiation, microwave LWP, and aerosol sampler.

- NOAA/ETL sfc/remote sensing instrumentation on Pacific and Atlantic buoy maintenance cruises, and at RICO (funded).

- Develop VOCALS data set through distributed satellite/ model/ in situ data archive at UCAR/JOSS. Archive ECMWF and NCEP hi-resolution column data at WHOI buoy and San Felix Island locations, in co-ordination with CEOP (some funding).

- Work with cloud-climate sensitivity Cloud Process Team (CPT) to feed into coupled model development.
2003-2010 diagnostic/modeling work
2003 ETL-enhanced cruises
SFI profiler
VEPIC data archive
2004/11 Cloudsat
2005/01 RICO
2006 VEPIC Field Exp. in the Eastern Pacific.

Modeling, empirical, and satellite studies
New Leader

Bob Weller assumed VOCALS leadership at VPM7 in 2005.

VPM7 VOCALS participants:
US (Bretherton, Fairall, Mechoso, Weller)
Chile (Garreaud, Ruttland, Pizarro)
Uruguay (Terra)
Ecuador (Cornejo)

Admiral Robert Weller
“Admiral” Weller provided strong leadership for two years. As VOCALS became ready to fight for funding, a veteran strategist was called into action in 2005:

Lord Roberto Mechoso.

He is shown here on “Double ITCZ”, in his celebrated crossing of the Andes.
In drawing the battle plan, it became evident that air support was needed. A young scientist at the U. Washington had been wondering about the ear-stagnation zone at 18°S and its collocated with maximum in CDC. He spoke in tongues about issues such as: Topographically induced? How deep? Sometime flush?

VOCALS needed a flush expert and...
Rob Wood became VOCALS Air Marshall
Barry Huebert brought gas exchange, ocean nutrients, bacteria, viruses, etc. He also got some fish.

Thank you, Barry
Monitoring Buoys, Satellites, Cruises

AIRBORNE
NCAR C130
DOE EG-1  CIRPAS
Twin Otter UK146
NERC Dornier 228?

SHIP
RV Ron Brown
RV Jose Olaya

MODELING
Operational Centers, Research Labs, Universities

VOCALS Strategy
The rest is present day history

- Proposal submitted to NSF/NOAA (R. Wood PI; C. Bretherton, B. Huebert, C. R. Mechoso, R. Weller): 1 Sep 06
- NSF/NOAA decides that “VOCALS is GO”: 6 Dec 06
- VOCALS Workshop at VAMOS VPM10, Santiago, Chile: 3-4 April 07
- First Modeling Workshop at NCAR: 18-29 May 07
- First Rex Preparatory Workshop at NCAR: 11-12 June 07
- NCAR EOL Facility Request: 1 Jul 07
- NSF deadline for VOCALS proposals: 15 Jul 07
- VOCALS-UK Consortium Planning Meeting, Reading, England: 27 Jul 07
- NOAA deadline for VOCALS proposals: 21 Sep 07
- Joint NSF/NOAA Panel on VOCALS 15-16 Oct 07
- VOCALS-UK Proposal Submitted to NERC: 30 Nov 07
Julia and Hugh

VOCALS will bestow upon you the greater share of honour. For the best hope I have. O, do not wish one more! This day in April is call'd the NERC's Review. If you outlive this day, and bring the money home, Will stand a tip-toe when this day is nam'd, Will yearly on the vigil feast your colleagues, And say "To-morrow is NERC's Review Day."
Then you will strip your sleeve and show your scars, And say "These wounds I had on NERC's Review Day."
You two, Julia and Hugh, you VOCALS-UK leaders; This day shall gentle your condition; And climatologists in England then-a-bed Shall think themselves accurs'd they were not there, And hold their laptops cheap whiles you speak About your fight on NERC's Review Day!
The funds come...

- NSF/NOAA funding decisions in late 07
- NERC provides funding for UK-VOCALS
- IMARPE Peru funds Filamentos Cruise
- Chile funds Paposo station
- DOE and NASA commit airplanes...

...and VOCALS has new heroes...
Our NOAA Monitor:

Jin Huang

She sold her jewels to fund the Ron Brown
Our NSF Monitor:
Walter Robinson

Shown here getting ready to campaign for the C 130 in VOCALS
Roberto and Rob in early 2008
Institutions Collaborating in VOCALS

University
Arizona State
Concepción, Ch
CSU
Drexel U.
Hawaii
Manchester UK
Miami
North Carolina State
Oregon State
Reading
U. Arizona
U. Chile
UCLA
U. Colorado
UCSD
U. Leeds UK
U. Washington
U. Wyoming

Research Labs
Brookhaven Nat.
COLA
CNRS/LMD France
IMARPE
IPRC
LEGOS
NASA GSFC
NCAR
NOAA/CIRES
NOAA/GFDL
NRL
Pacific Northwest
Woods Hole

Operational Centers
BMRC Australia
CPTEC Brazil
ECMWF Int.
JMA Japan
NCEP US
UKMO UK

Logistic Support: UCAR JOSS

Funding $25M+
And here we are...
And when the burning moment breaks,
   And all things else are out of mind,
And only Love-of-Discovery takes
   Scientists by the throat, and makes them blind,

Through joy and blindness they shall know,
   Not caring much to know, that still
There are more mysteries to unravel, so
   That it be not the Destined Will.

But today, they have Hypotheses to test,
   And as the low level jet moans and sings;
Scientists craft papers with strong hands,
   And Nature will acclaim their findings.

VOCALS history is Just Beginning,
and YOU are Writing It...