

CUpEx: Chilean Upwelling Experiment

Tongoy (30°S), 21 Nov – 5 Dic 2009

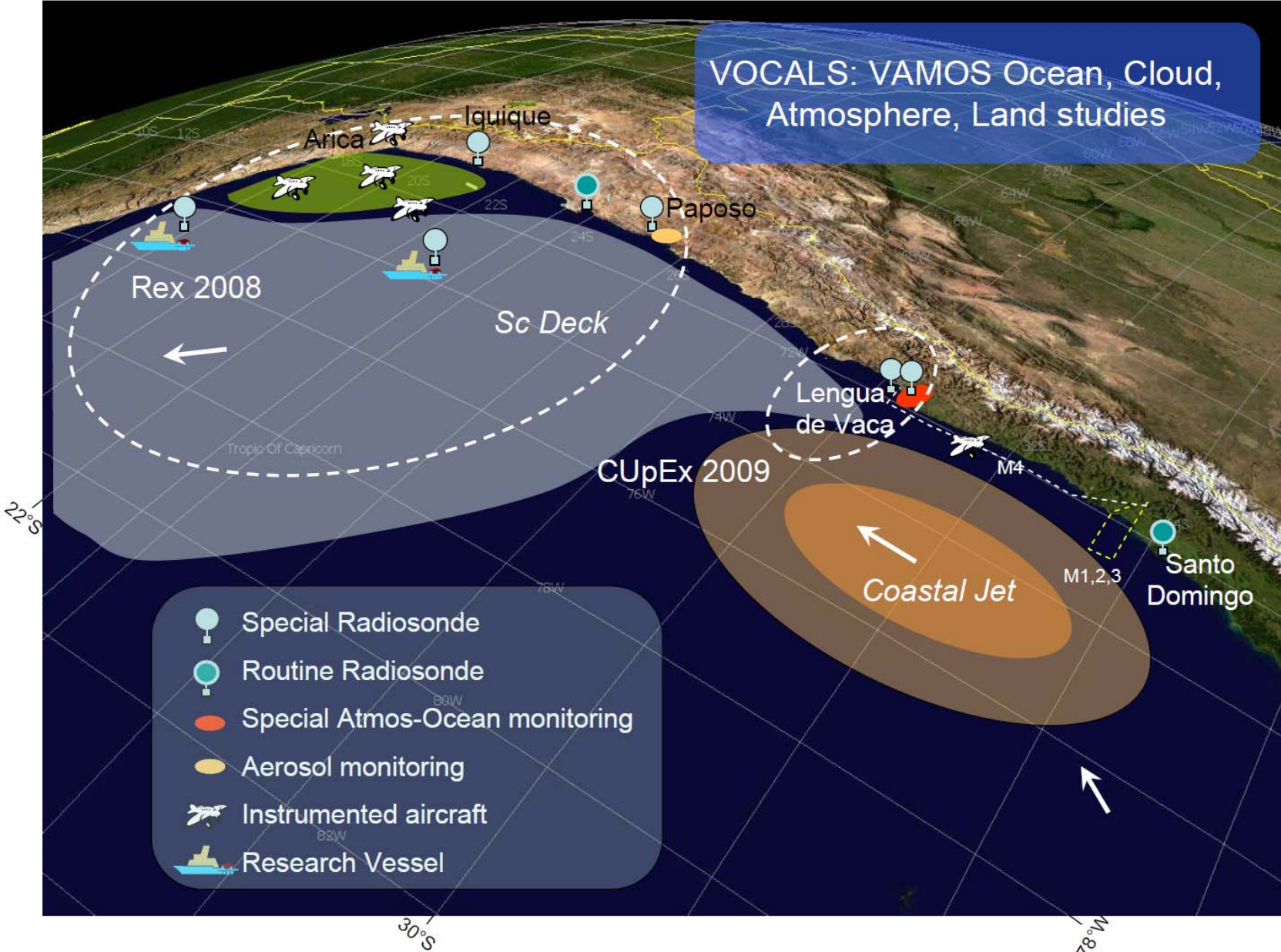
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(2) Center for Advanced Studies in Arid Zones (CEAZA), Chile

(3) Department of Geophysics, Universidad de Concepción

VOCALS: VAMOS Ocean, Cloud, Atmosphere, Land studies



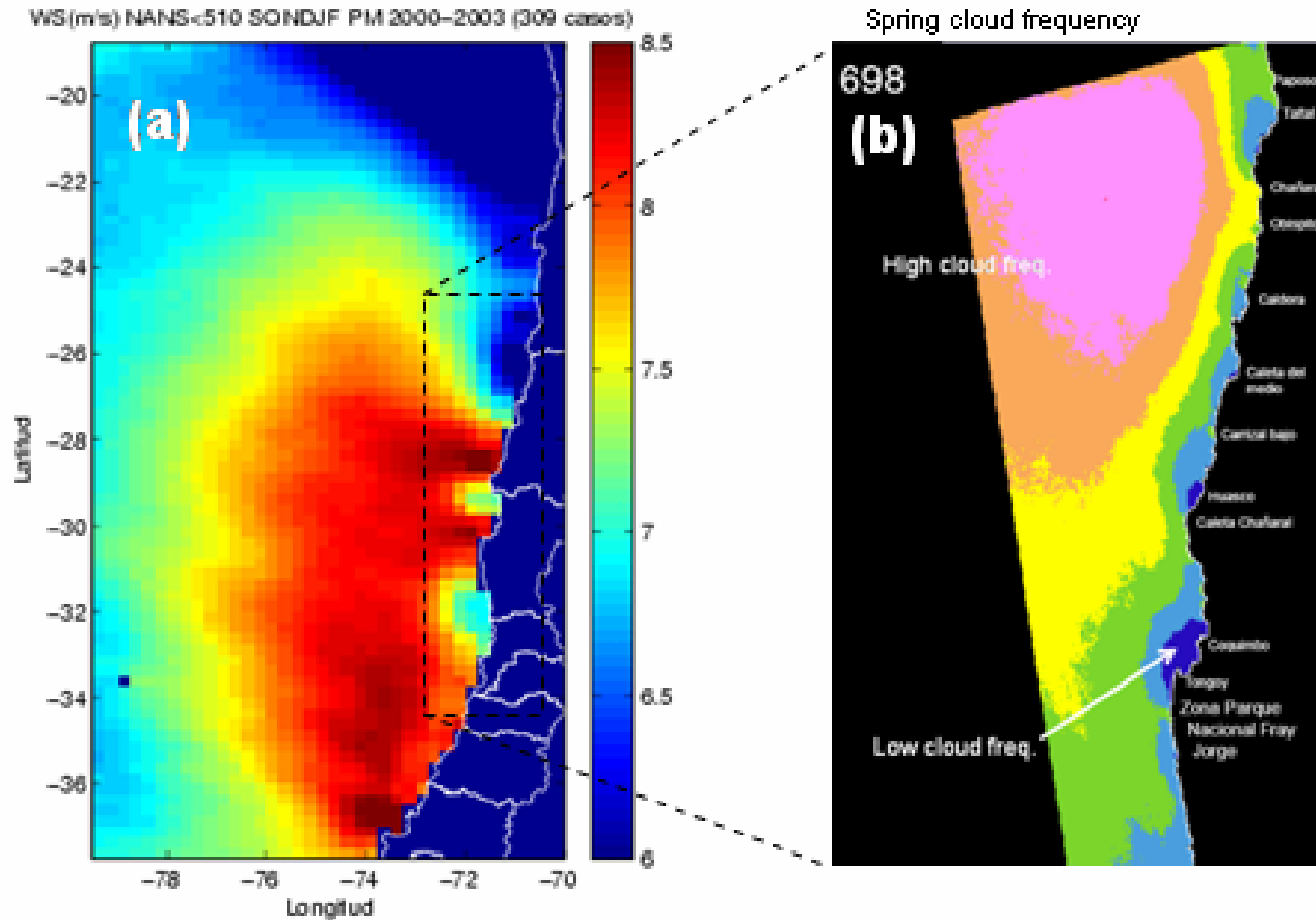
List of projects and institutions supporting CUpEx

Platform & Instruments	PIs	Funding
AIMMS-20 on BE90	R. Garreaud (DGF)	FONDECYT-Grant 1090492, DGF-UCH, DGAC
AWS, Radiosondes at Tongoy and Talcaruca	J. Rutllant (DGF) R. Muñoz (DGF)	FONDECYT-Grant 1090492, DMC, CNE, DGF-UCH
Tongoy bay buoy and AWS Islote Pajaros	M. Ramos (CEAZA)	CEAZA, INOVA-Corfo, ACT19-R19 (PBCT)
Surface Current Radars	D. Figueroa (DGEO)	FONDEF-Grant D03I-1104
Ocean & coastal moorings	O. Pizarro (DGEO) M. Ramos (CEAZA)	FONDECYT-Grant 1090791 FONDECYT-Grant 1080606

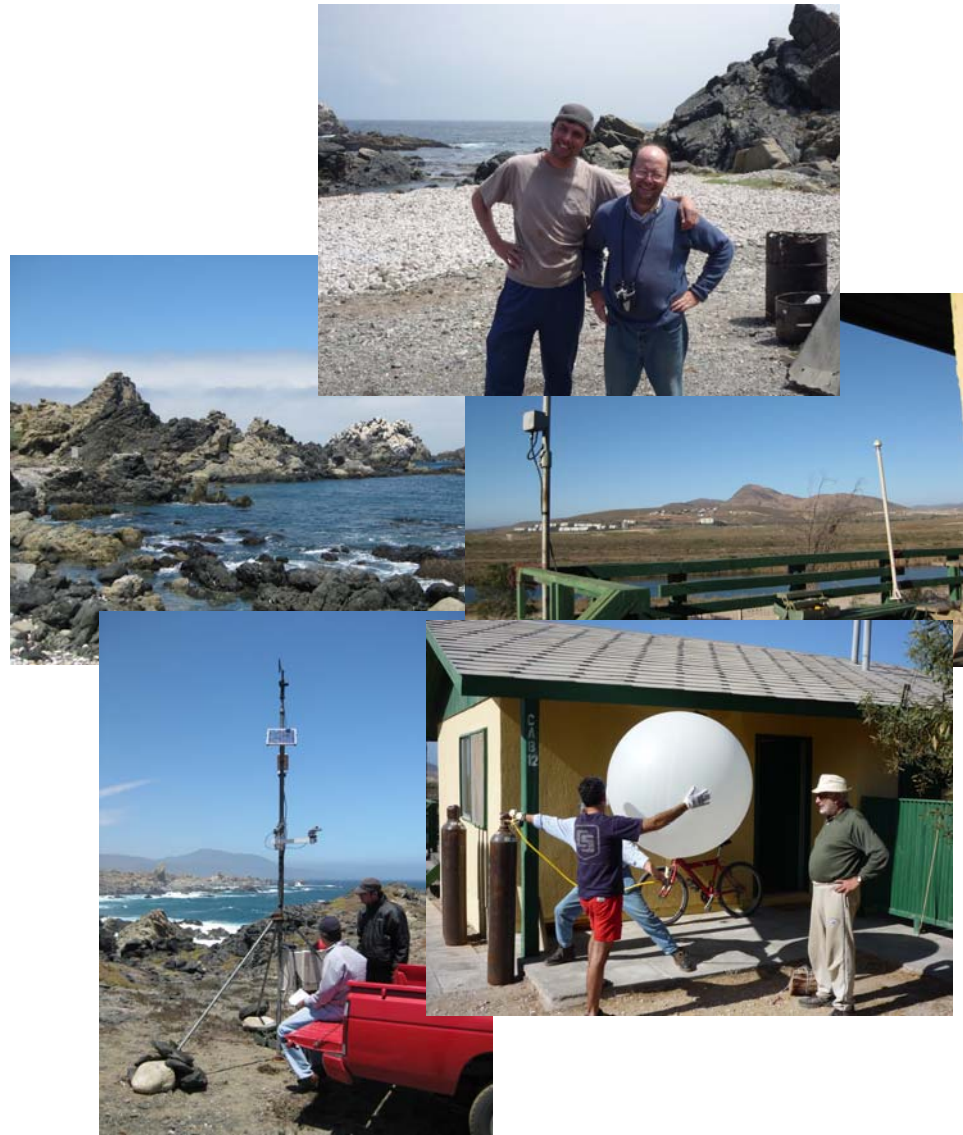
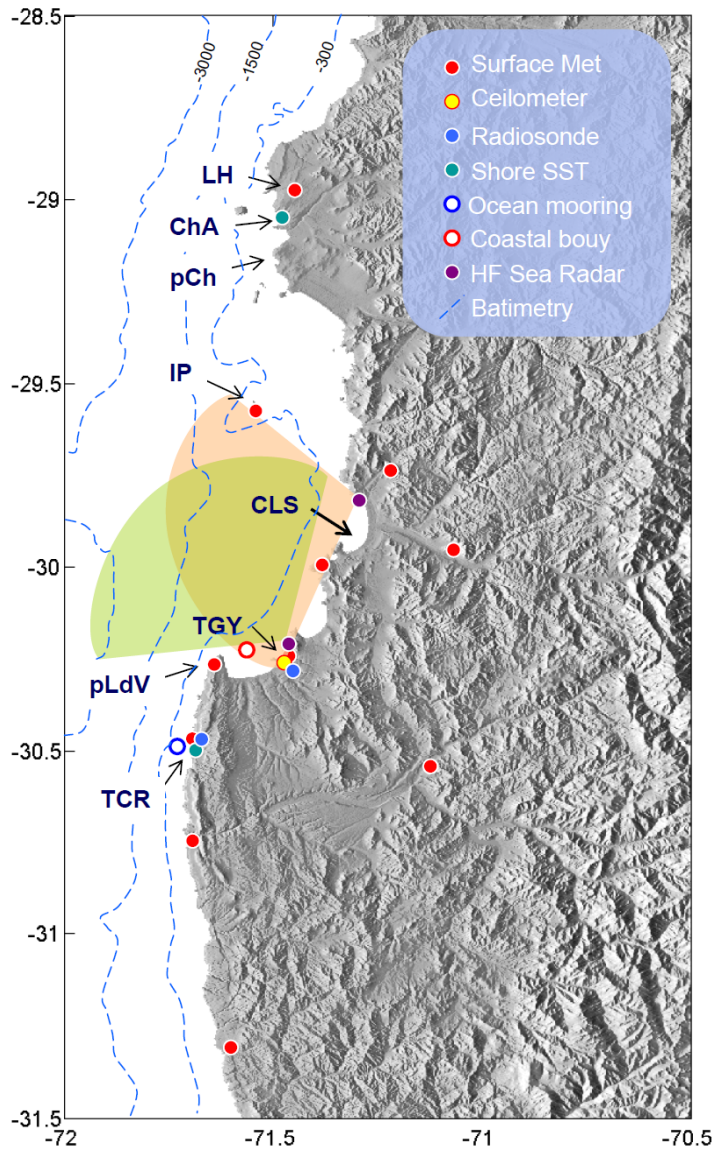
DGF : Department of Geophysics, Universidad de Chile
 DGEO: Department of Geophysics, Universidad de Concepción
 CEAZA: Centro de Estudios Avanzados de Zonas Aridas
 DGAC: Dirección General de Aeronautica Civil
 DMC: Dirección Meteorológica de Chile
 CNE: Comisión Nacional de Energía

Goals of Fondecyt 1090492 (Garreaud, Muñoz, Rutllant)

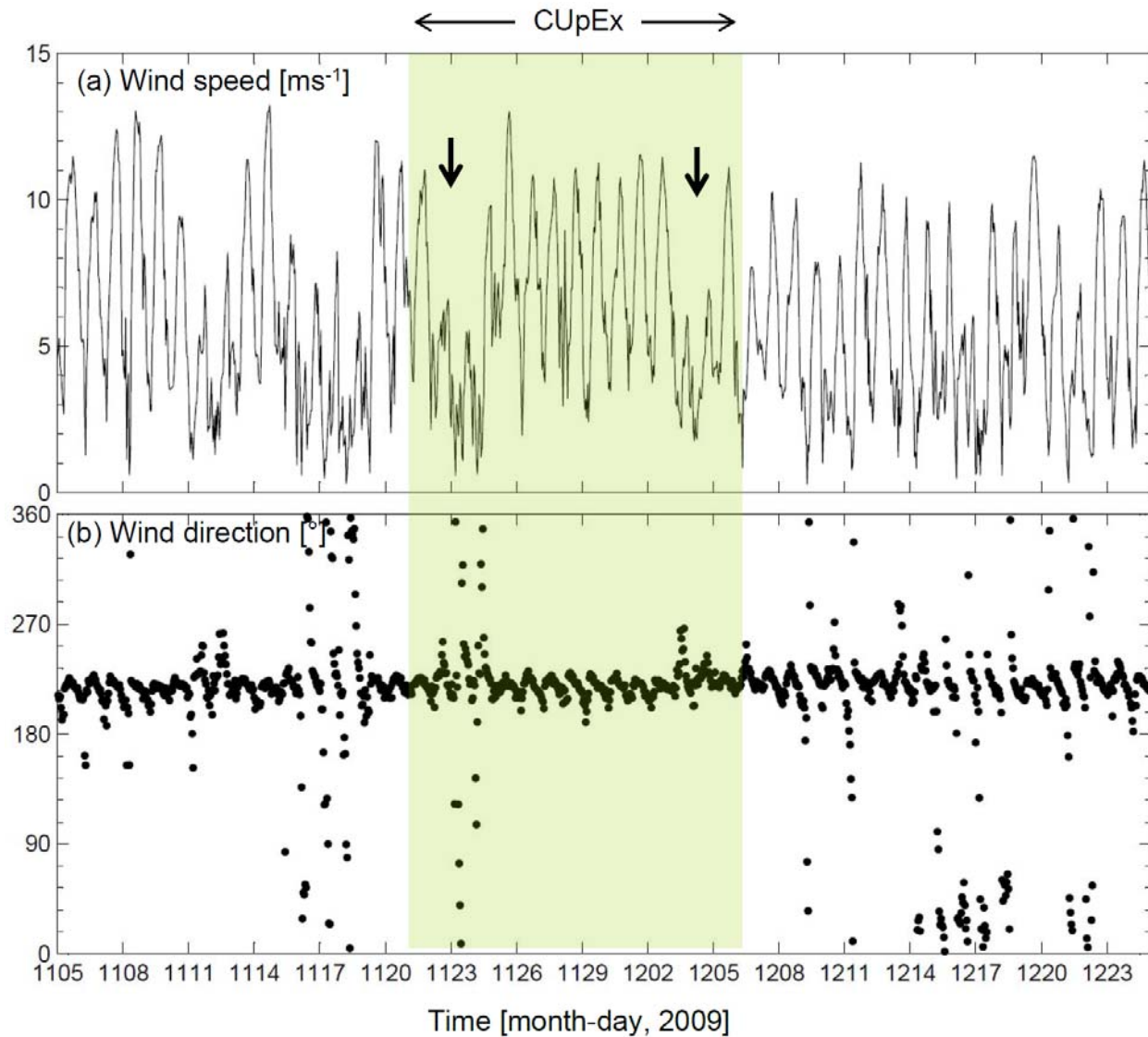
Understand the alongshore structure of the MBL and its diurnal cycle



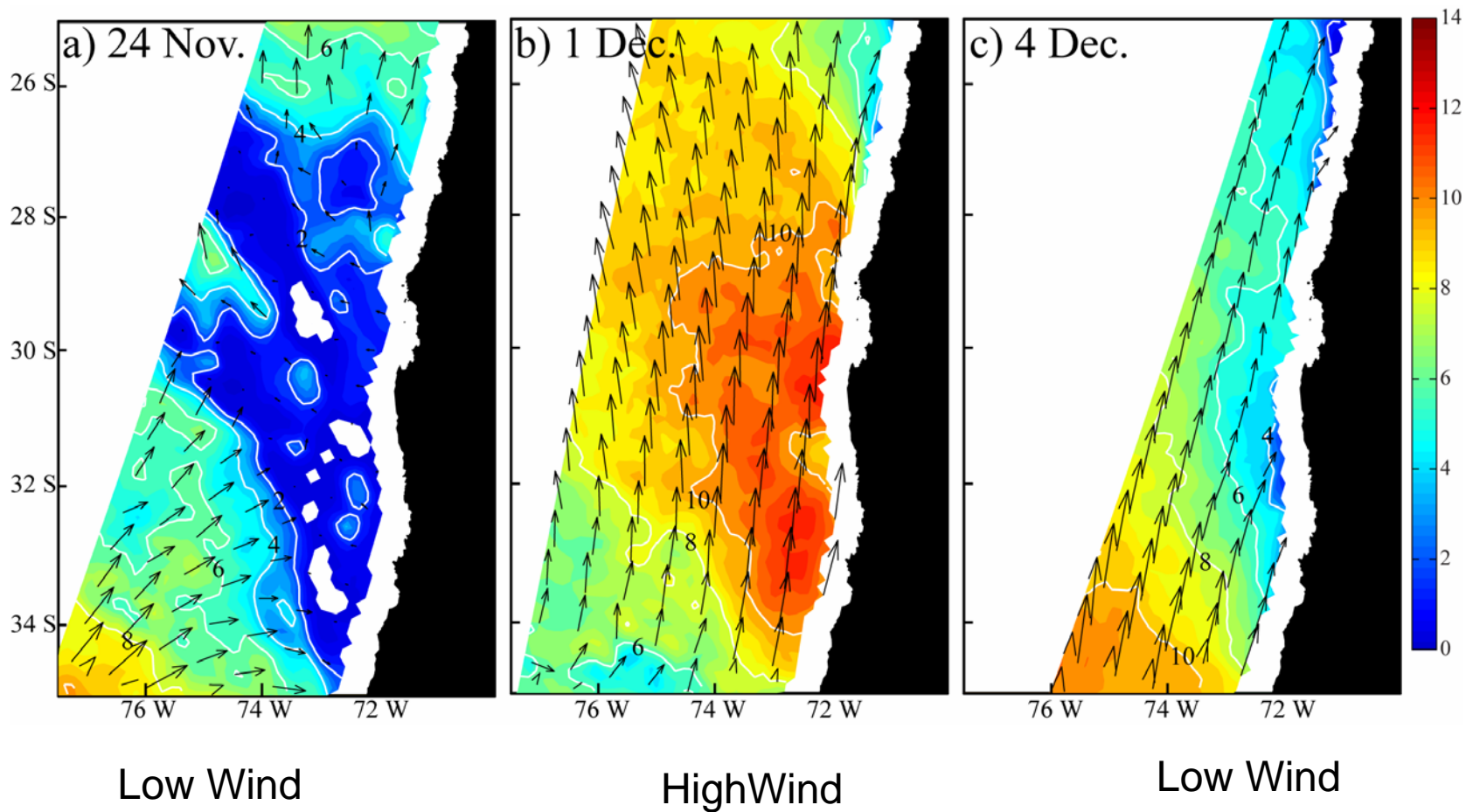
CUpEx sites



3.8 m Wind speed and direction at LdV (DGF) Nov-Dec 2009

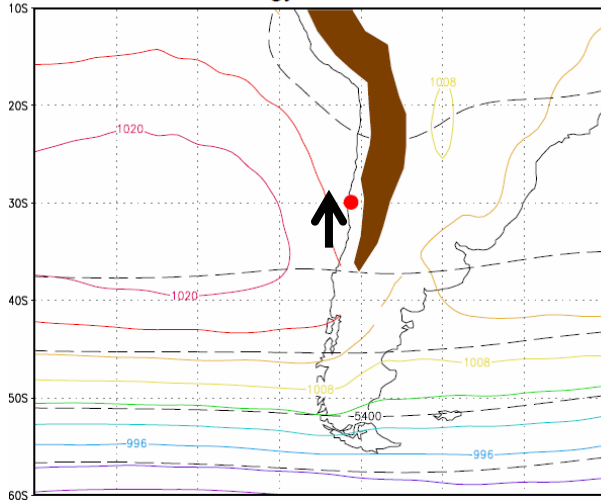


Synoptic variability during CUpEx: ASCAT 10-m winds

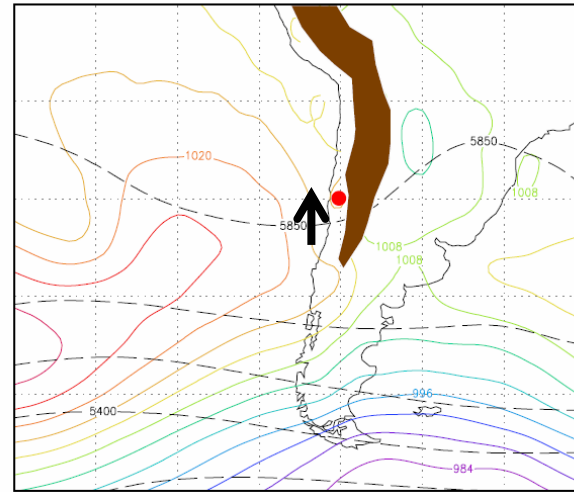


Synoptic variability during CUpEx

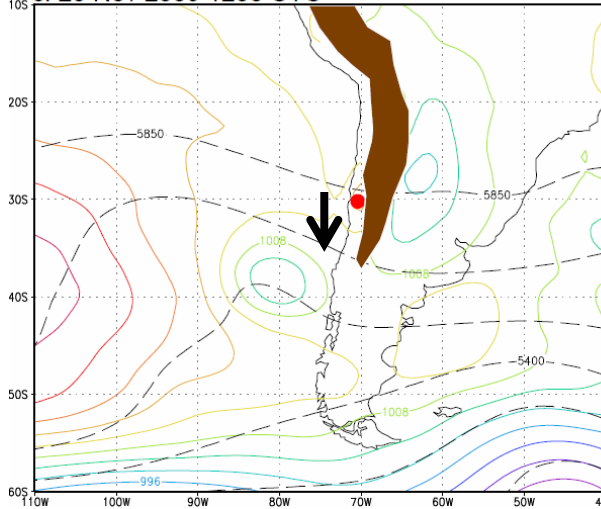
a. Nov/Dec Climatology



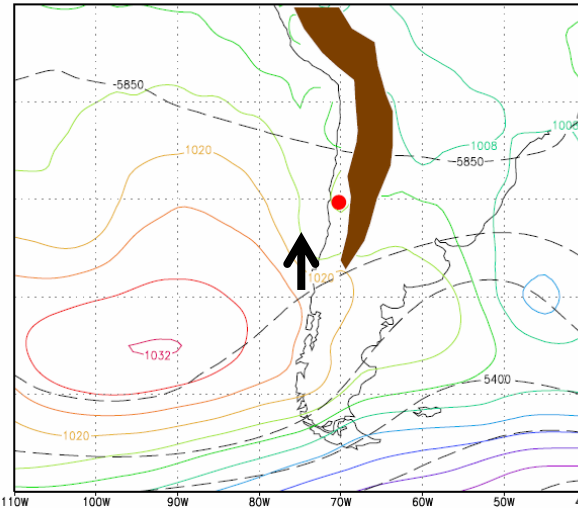
b. 25 Nov – 2 Dec 2009 average



c. 23 Nov 2009 1200 UTC



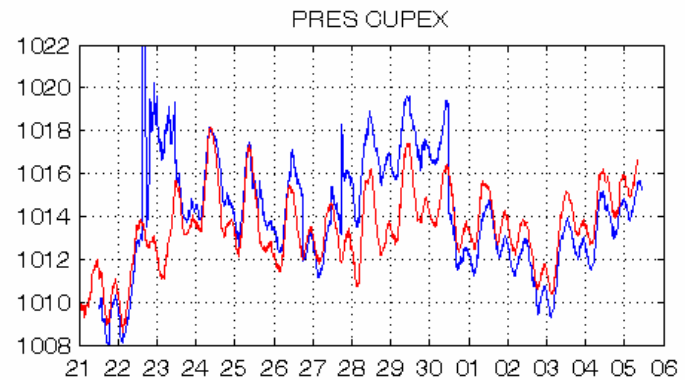
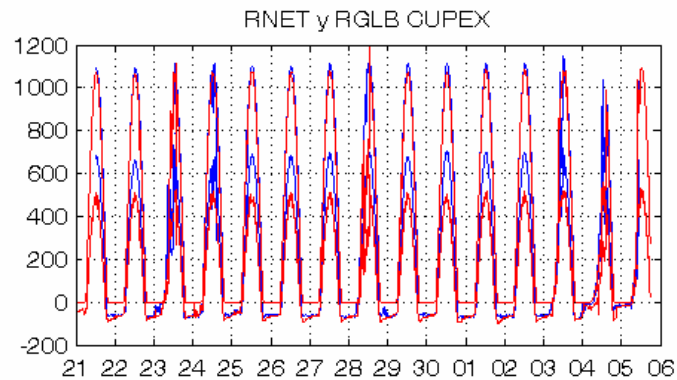
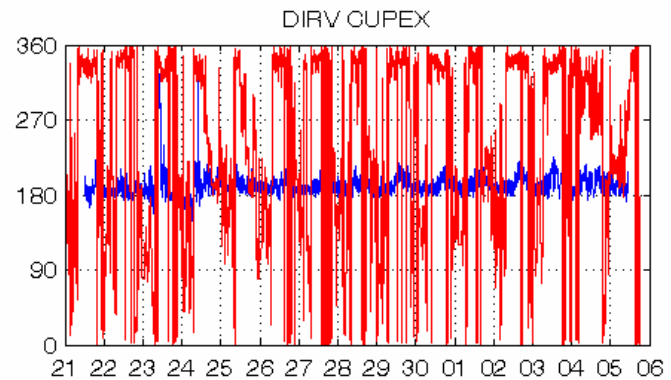
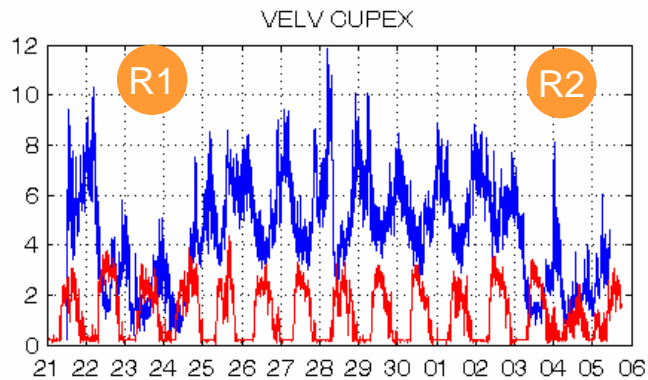
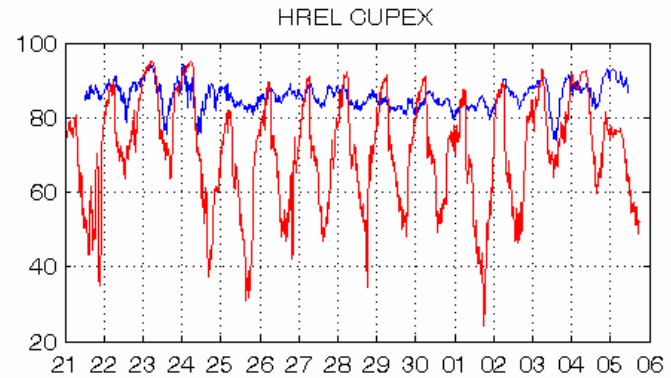
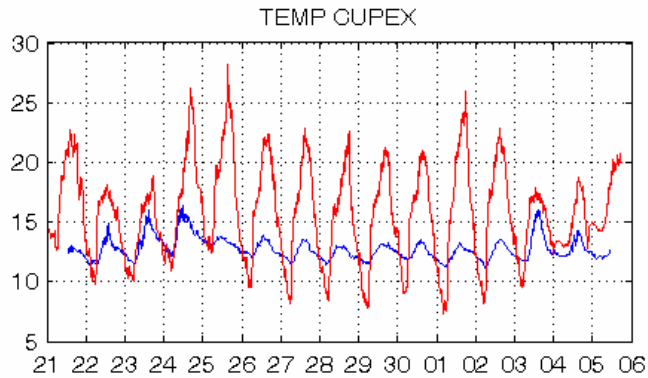
d. 3 Dec 2009 1200 UTC



↑ PGF

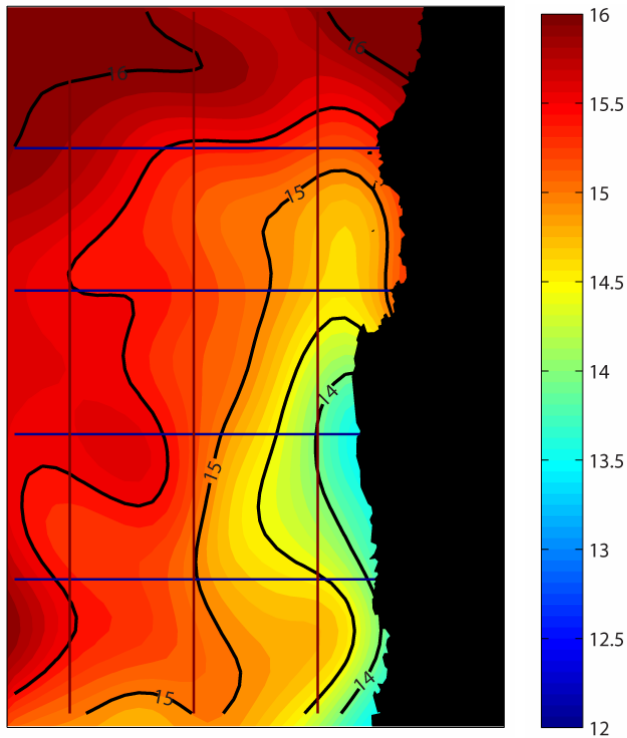
$$-\frac{1}{\rho} \frac{\partial p}{\partial y} = \frac{C_d}{H} v^2 \approx v$$

Tongoy & Talcaruca data during CUPEX

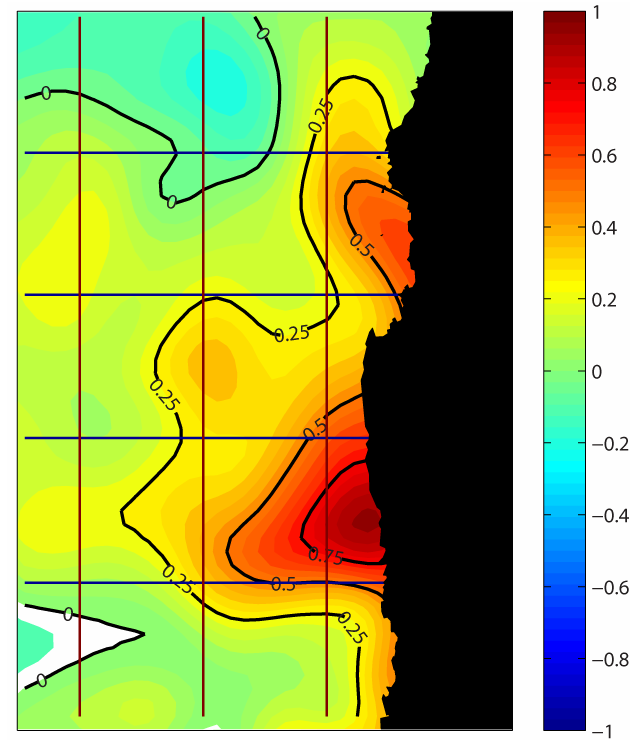


Synoptic variability during CUpEx: SSMI SST

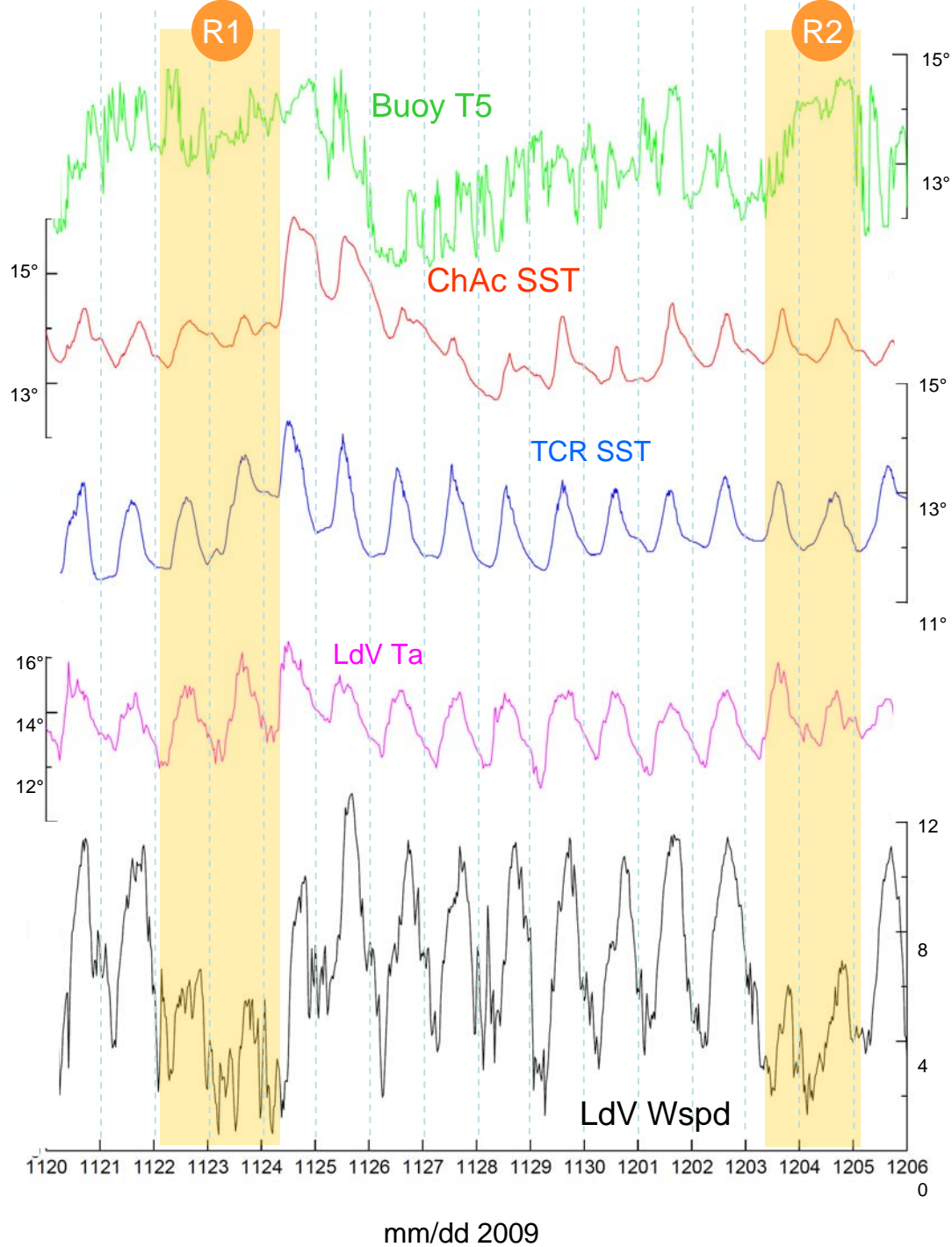
High wind SST field [C]



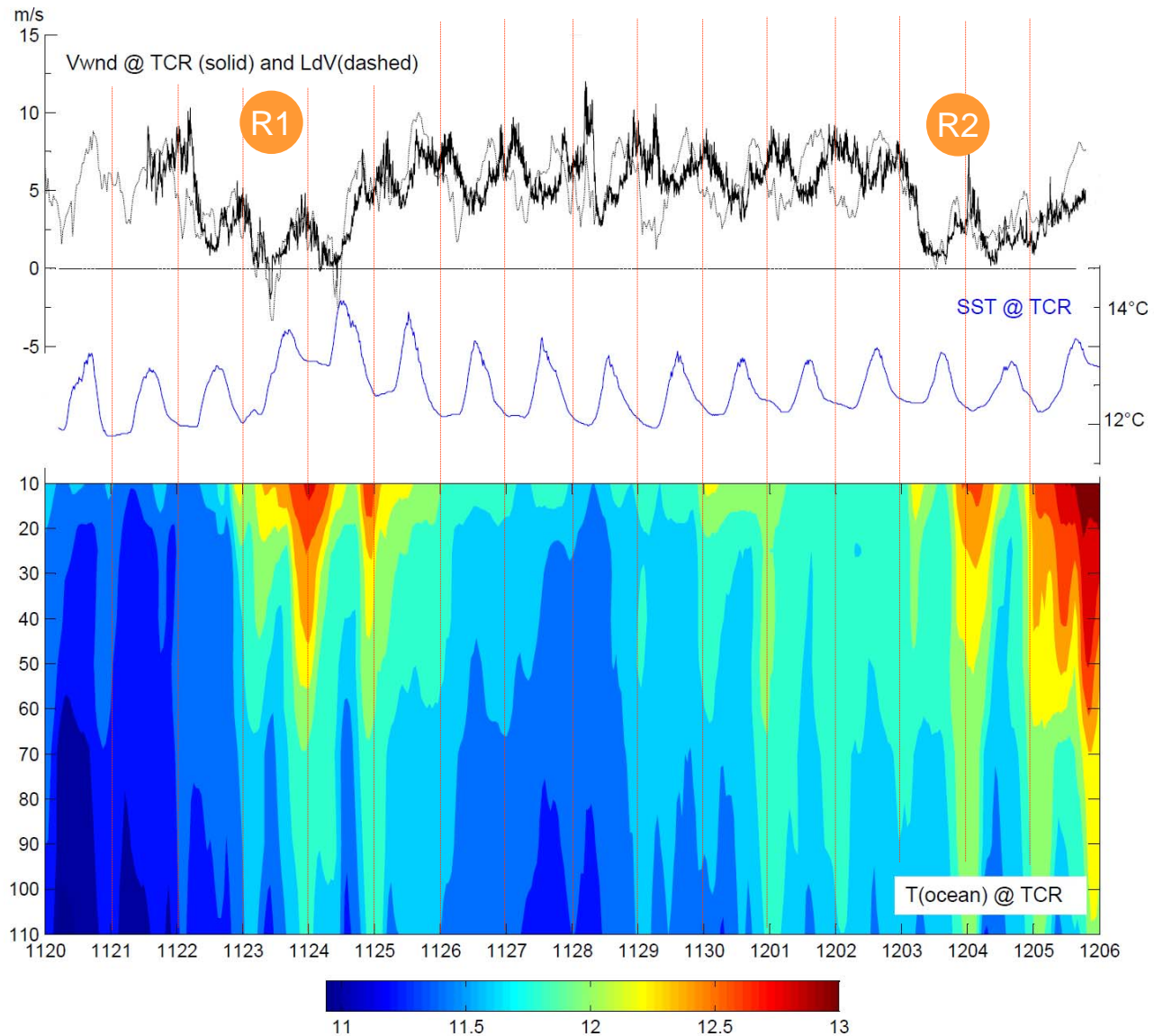
Low - High wind SST field [C]



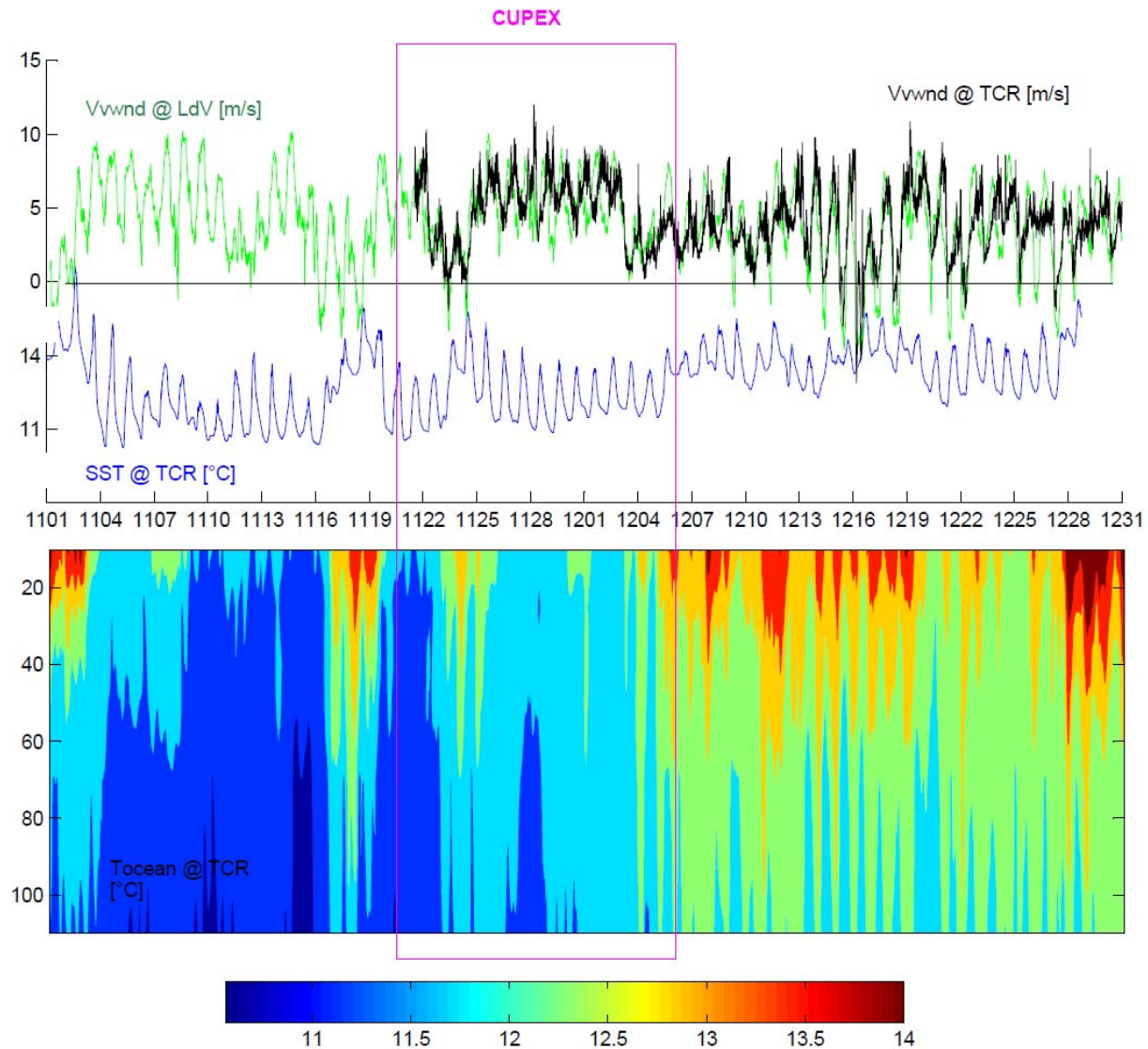
Synoptic variability during CUPEx: Local SST & wind



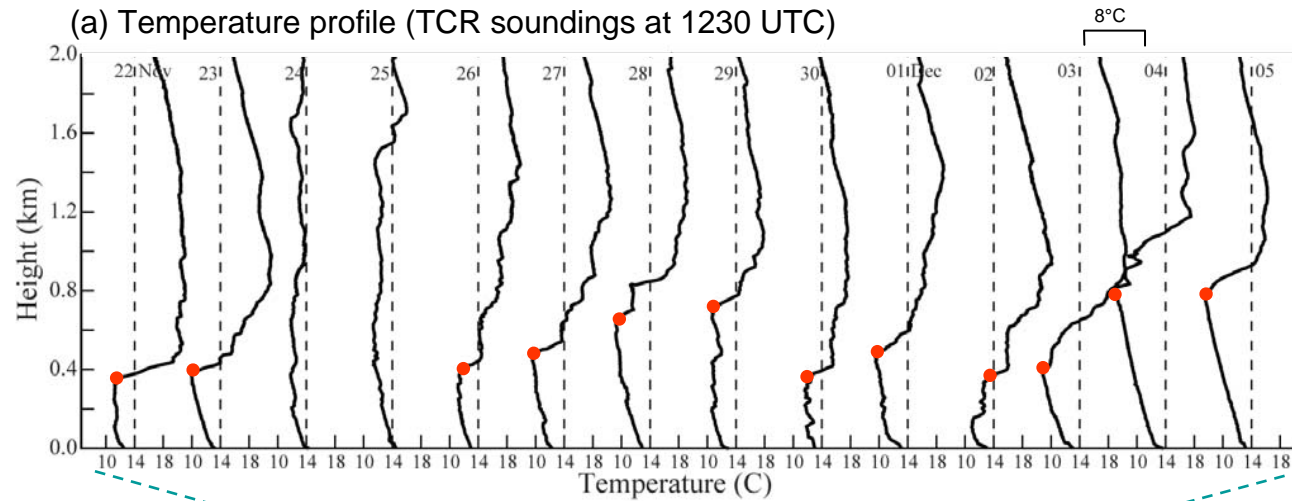
Synoptic variability during CUpEx: Local T(Ocean) & wind



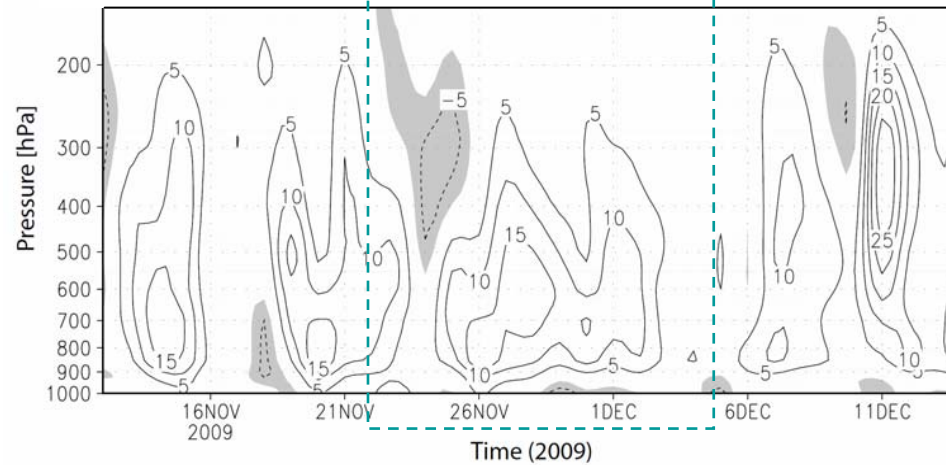
Synoptic variability during CUpEx: Local T(Ocean) & wind: Summer transition?



Synoptic variability during CUpEx: MBL & TI

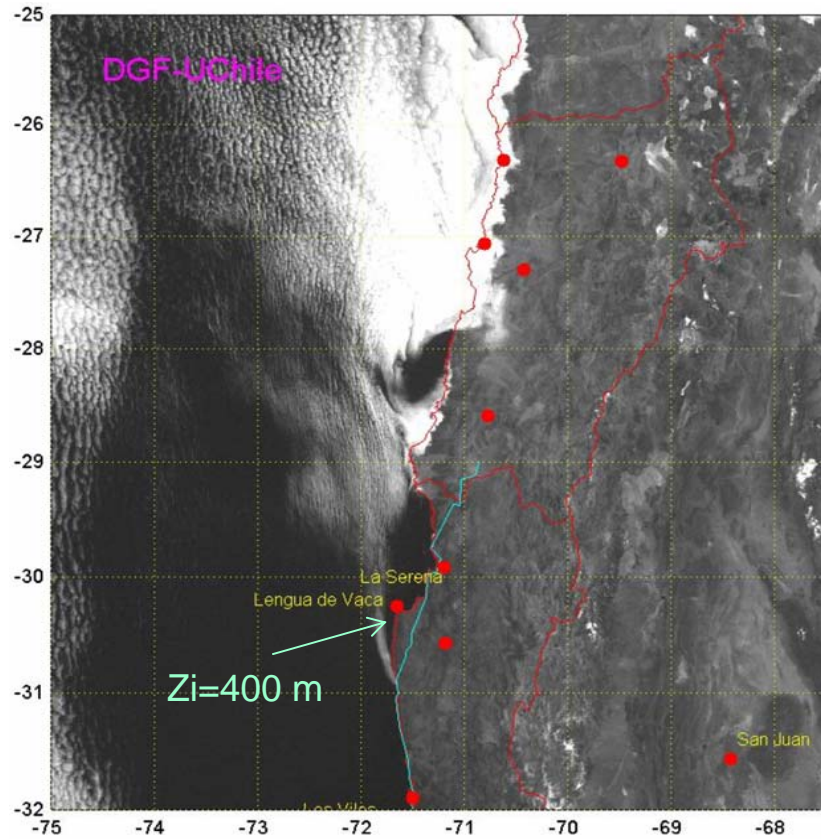


(b) Vertical velocity (ω)

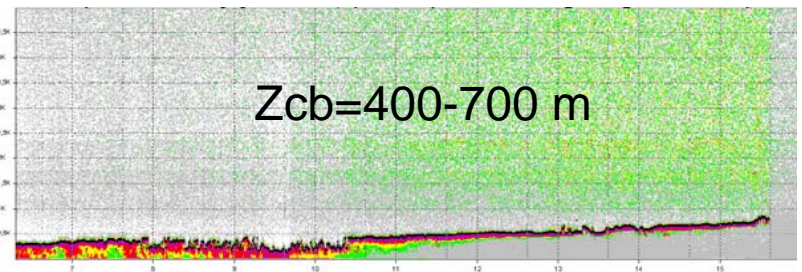
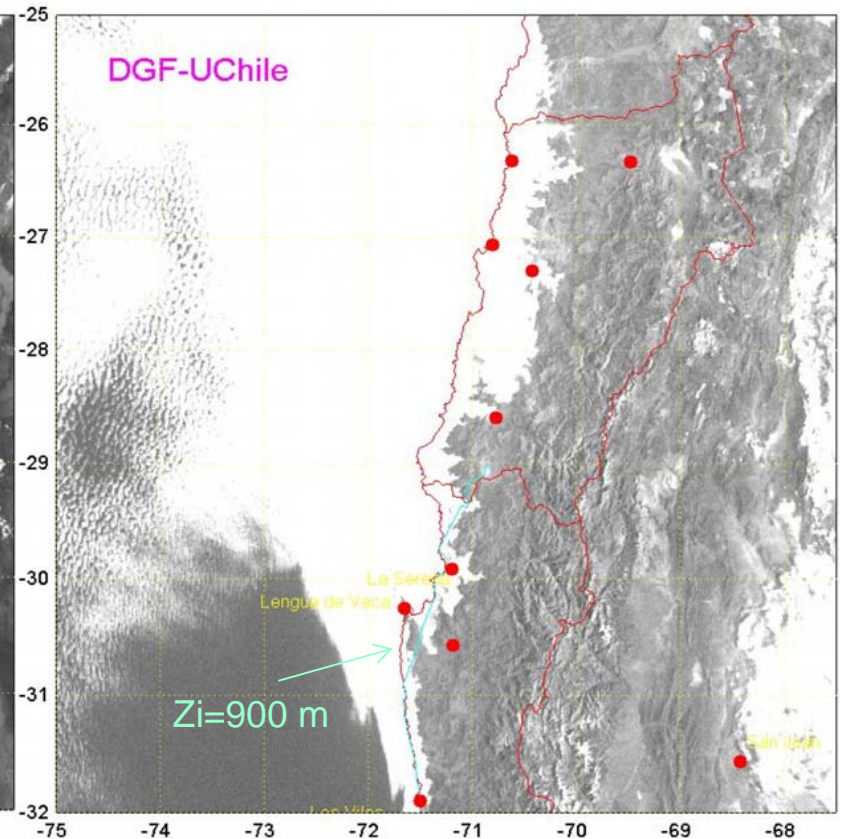


Synoptic variability during CUpEx: Clouds

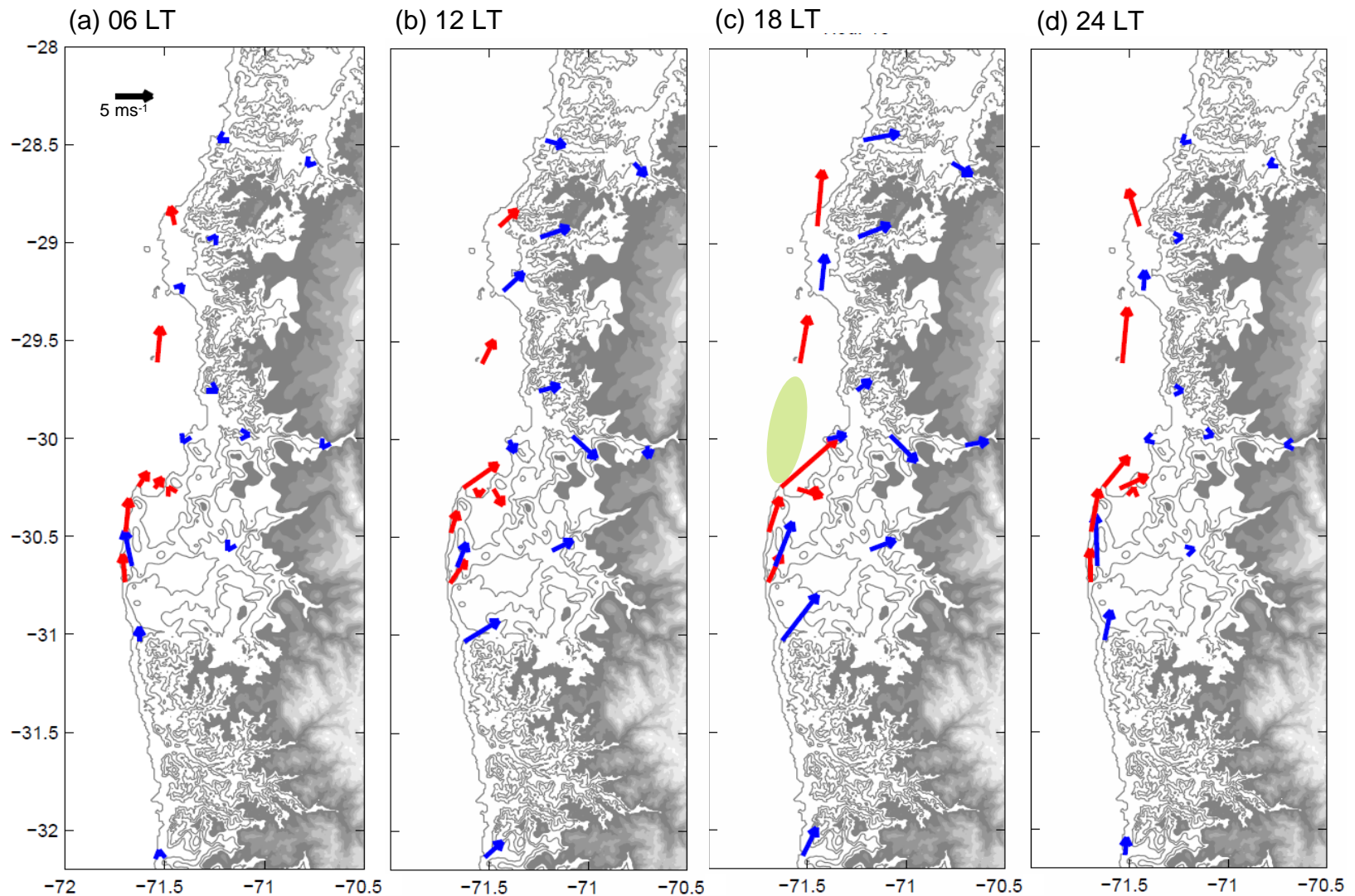
(a) 1409 UTC Dec 02, 2009.



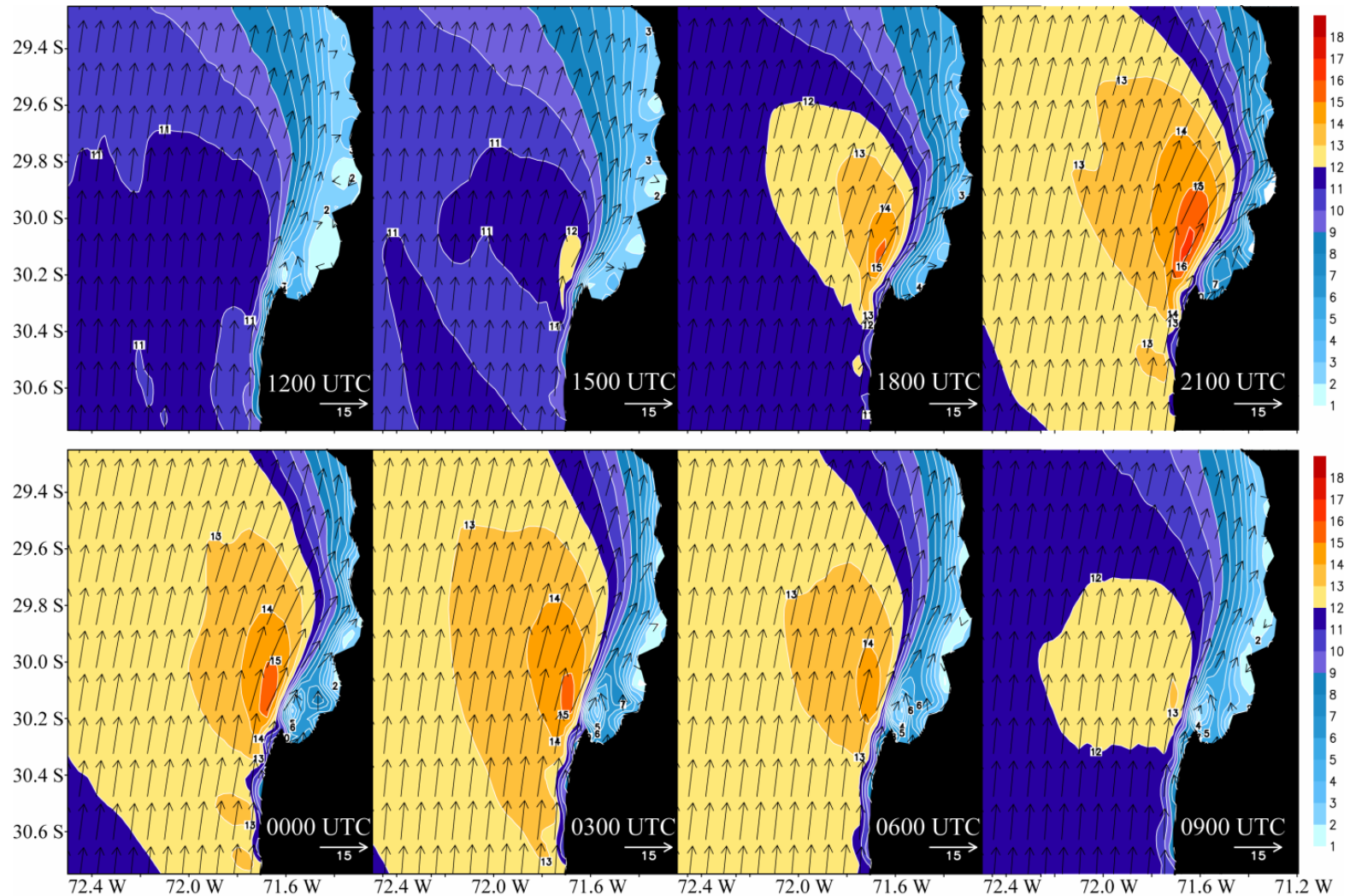
(b) 1139 UTC Dec 03, 2009.



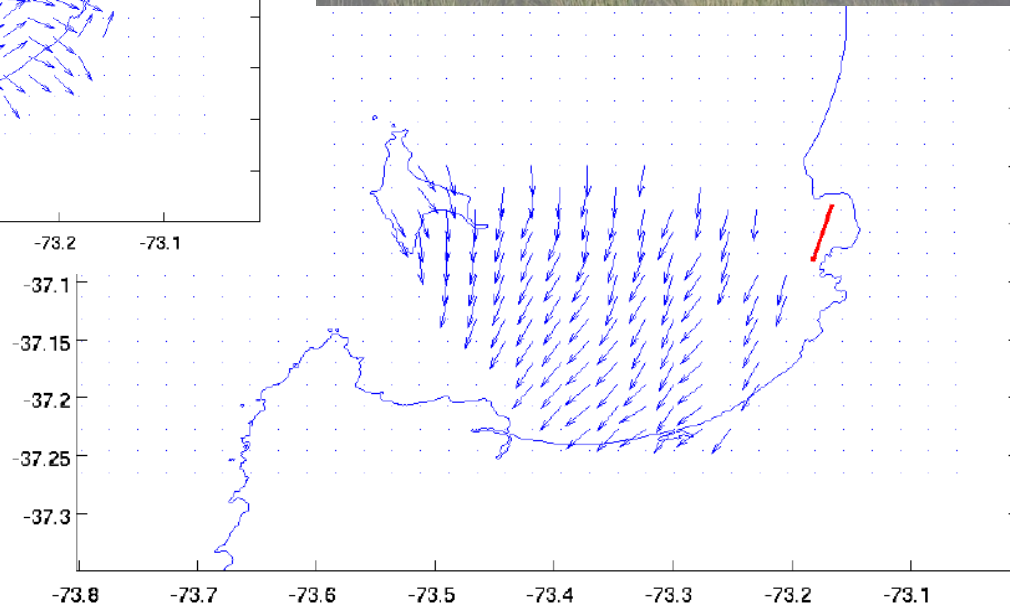
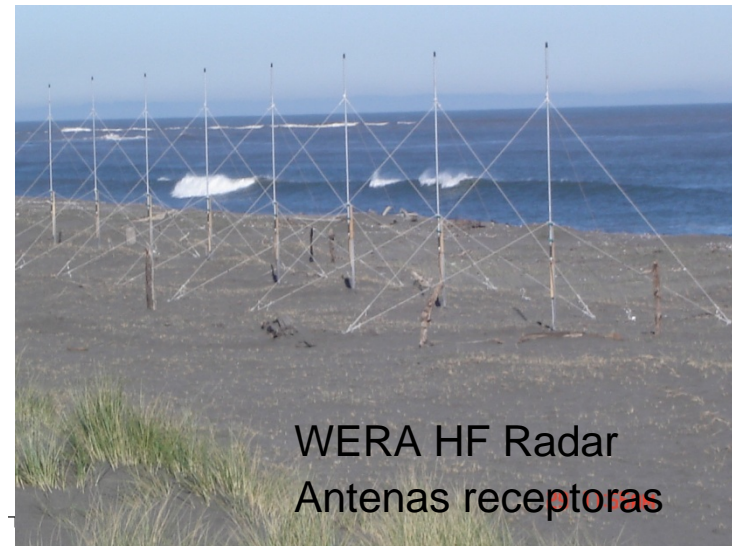
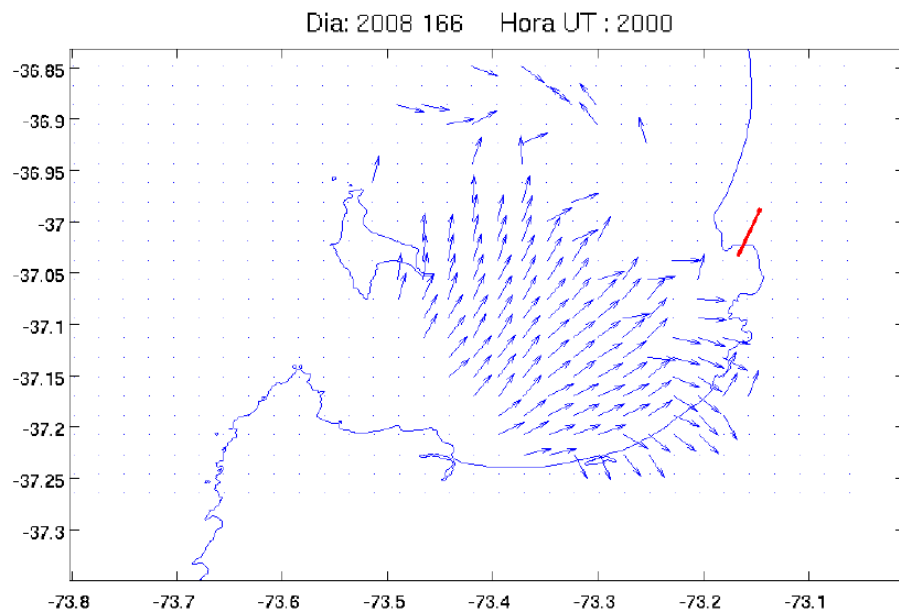
Mean diurnal cycle during CUpEx: Sfc winds



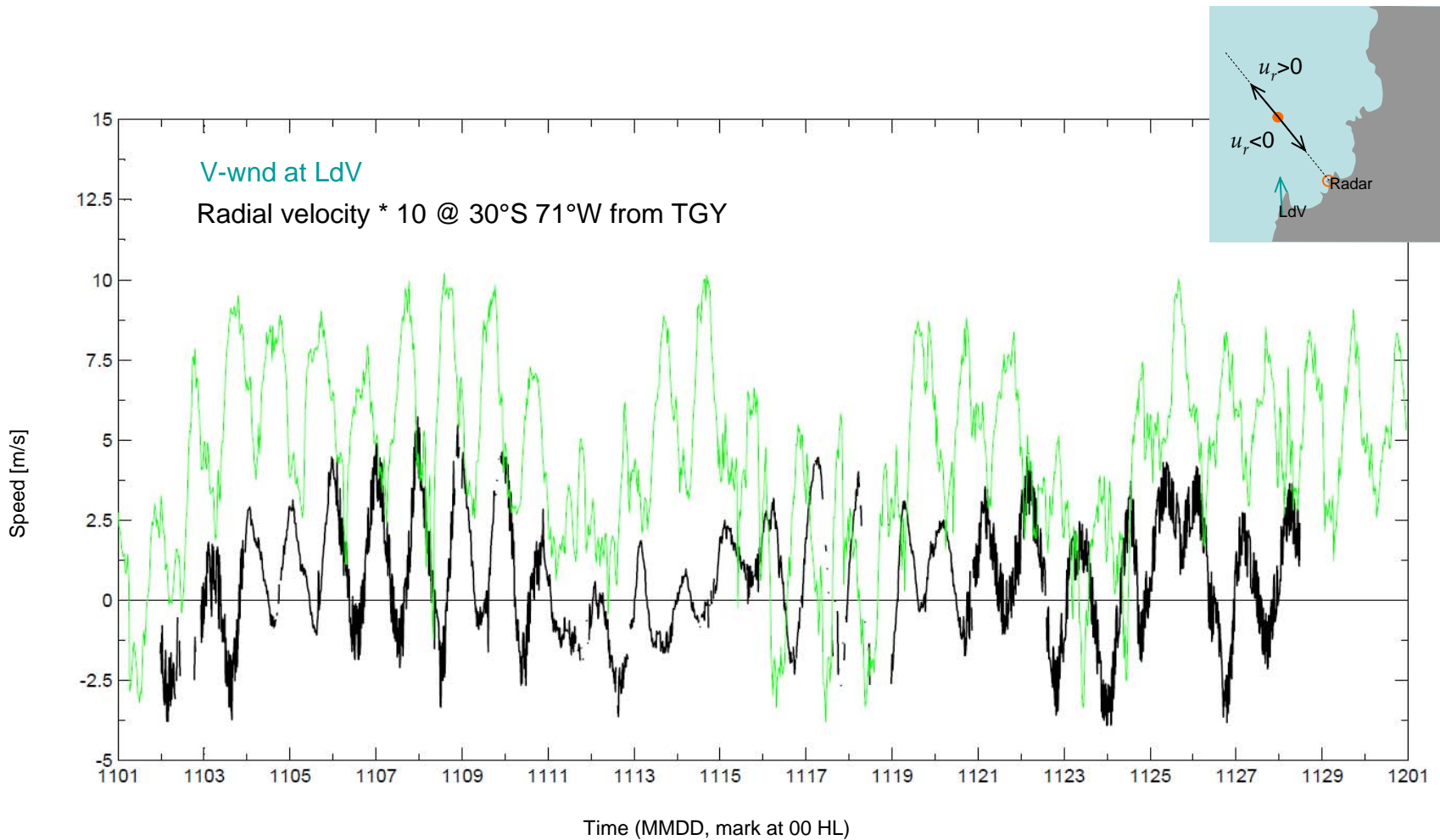
Mean diurnal cycle during CUpEx: Sfc winds (WRF 3km)



Mean diurnal cycle during CUpEx: Sfc currents

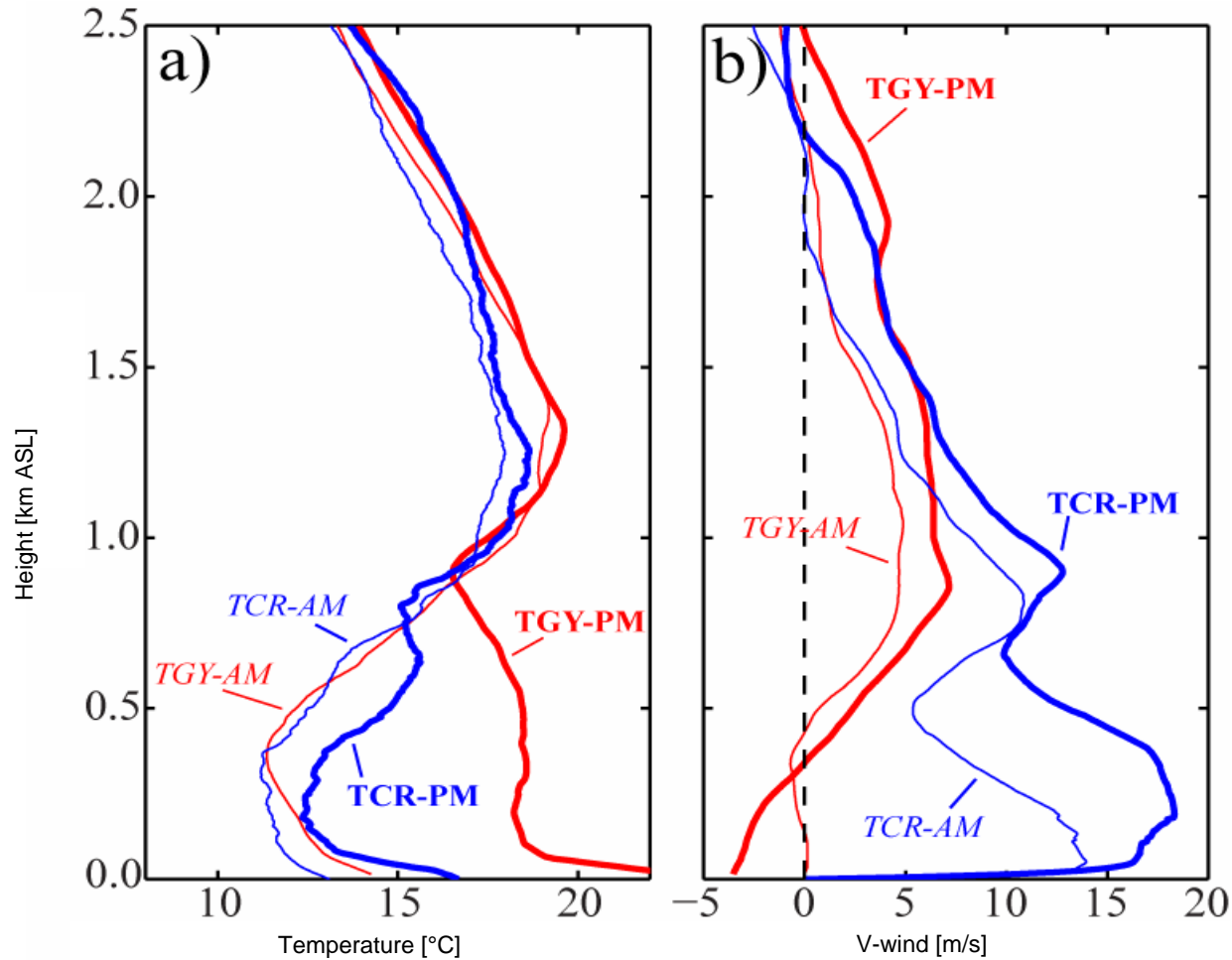


Mean diurnal cycle during CUpEx: Sfc currents

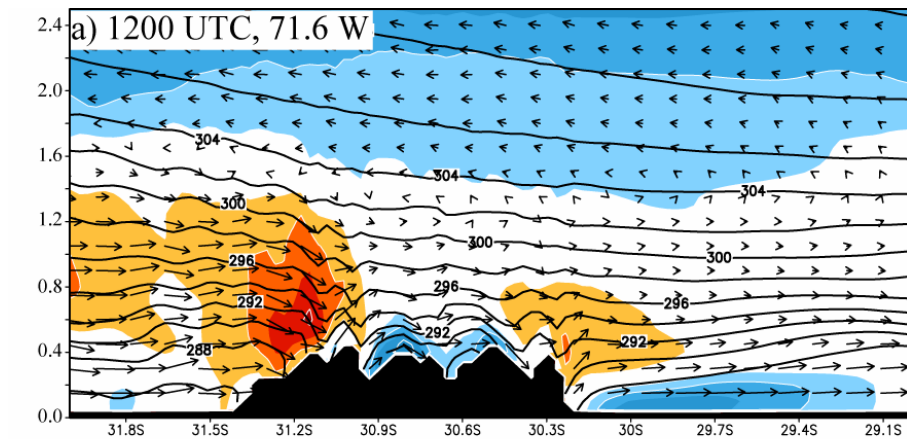


Mean diurnal cycle during CUpEx: Upper-air data

Tongoy (note large PM warming) & Talcaruca (note double jet structure)

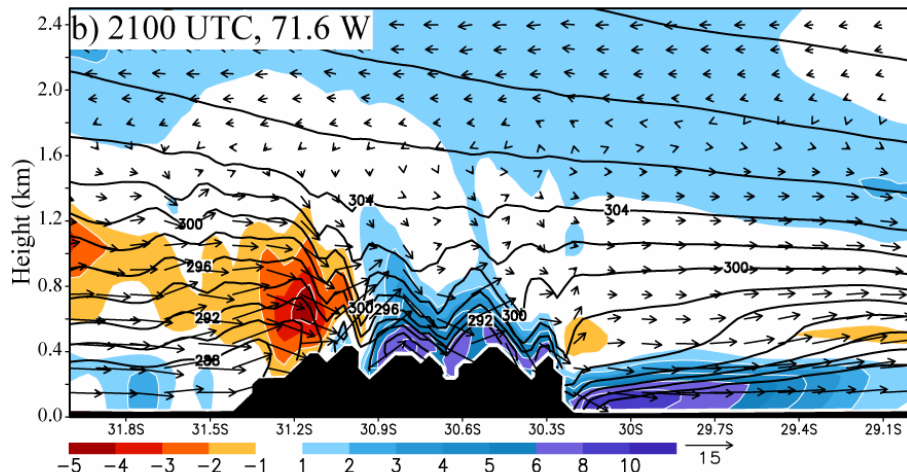


Mean diurnal cycle during CUPEx:
WRF Upper-air data

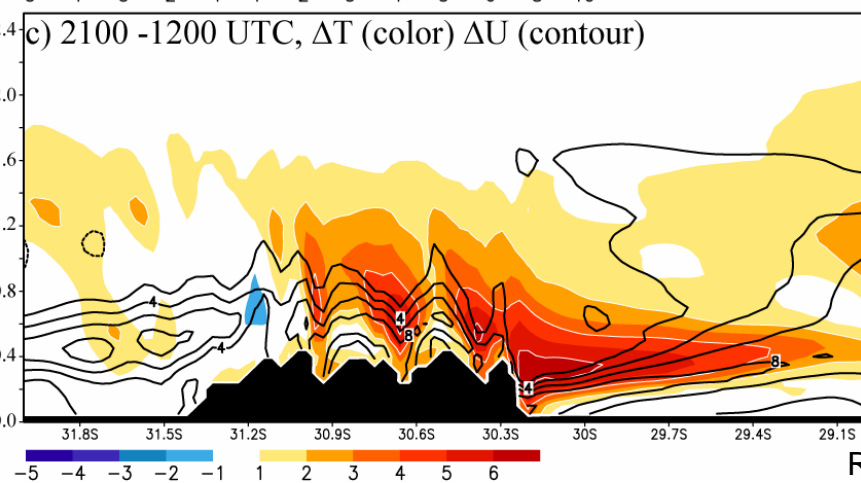


Alongshore
Structure (71.6W)

v,w (arrows)
Theta (contours)
U-wind (colors)



v,w (arrows)
Theta (contours)
U-wind (colors)

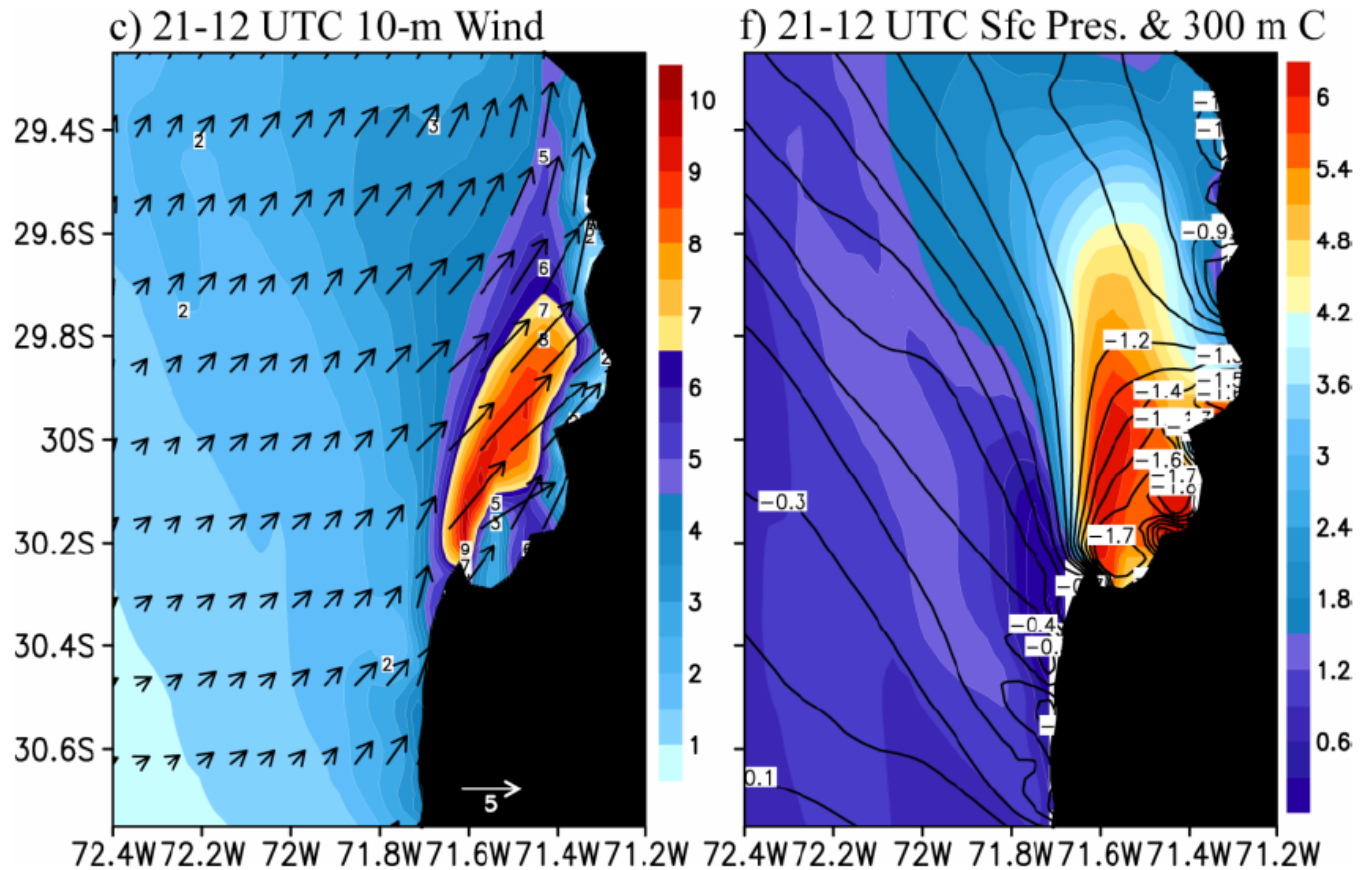


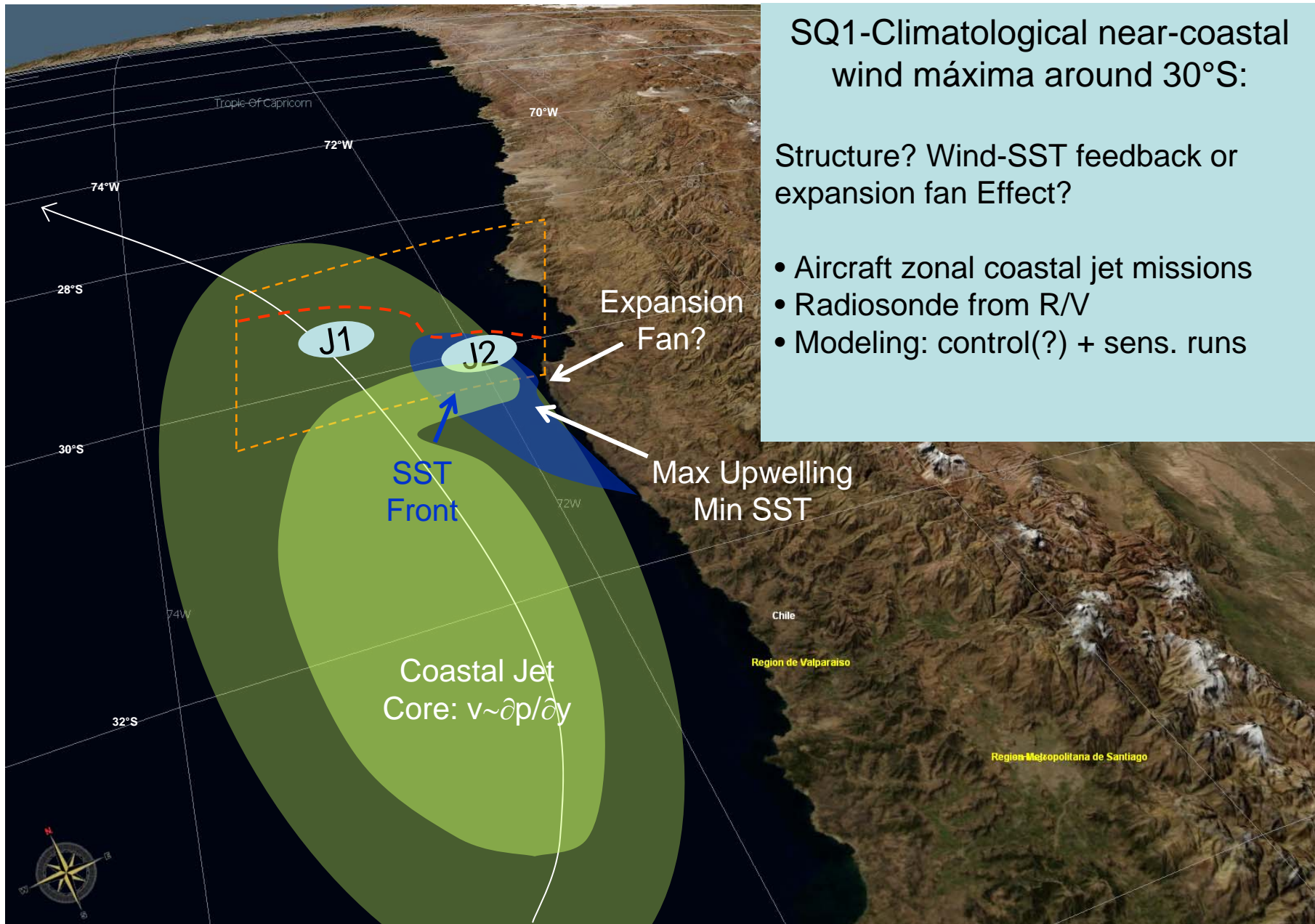
dTheta (colors)
dU-wind (contours)

Mean diurnal cycle during CUpEx: Sfc+Upper-air data

PM-AM Wind difference

PM-AM Sfc Pressure & 300 m Temp



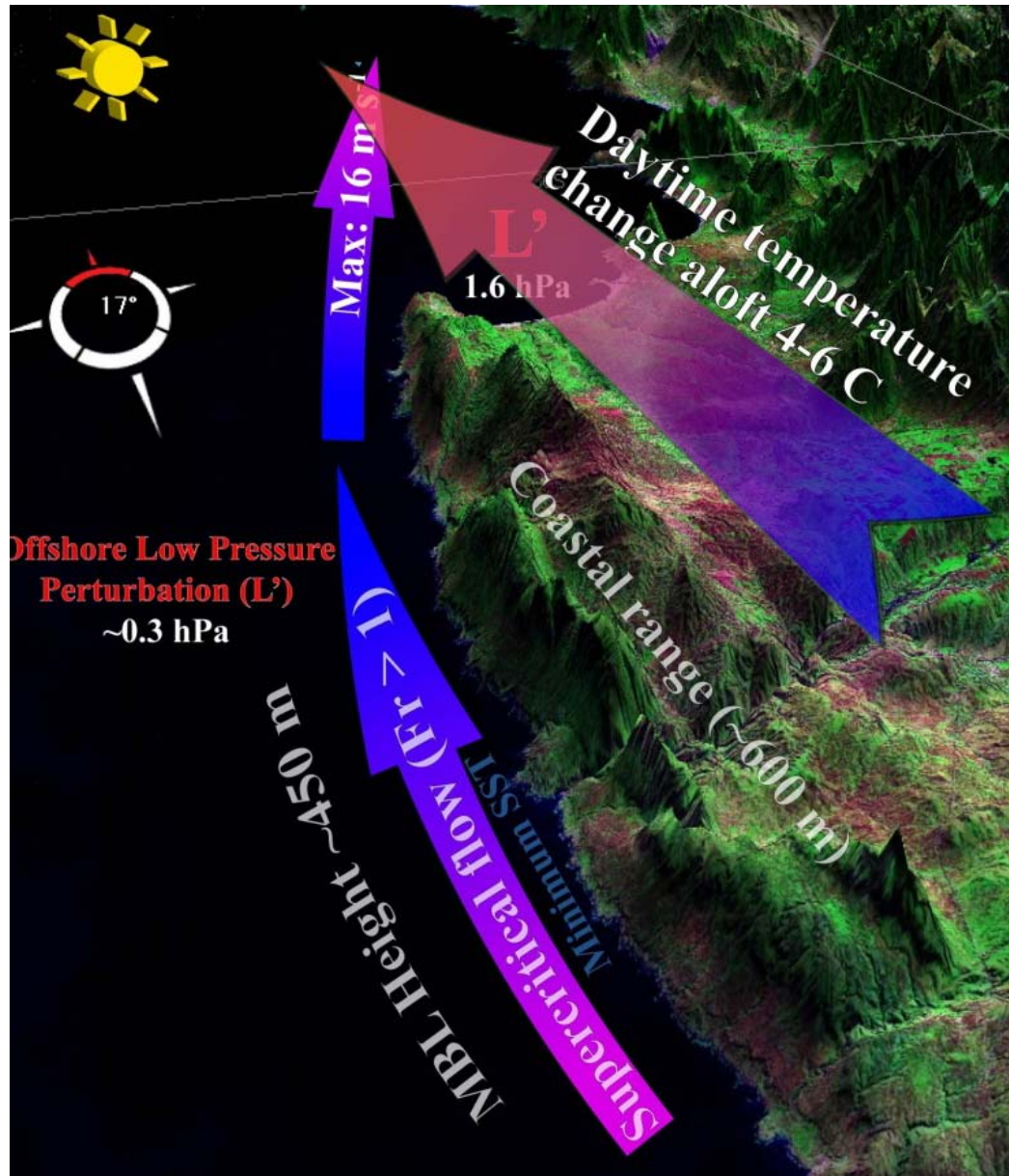


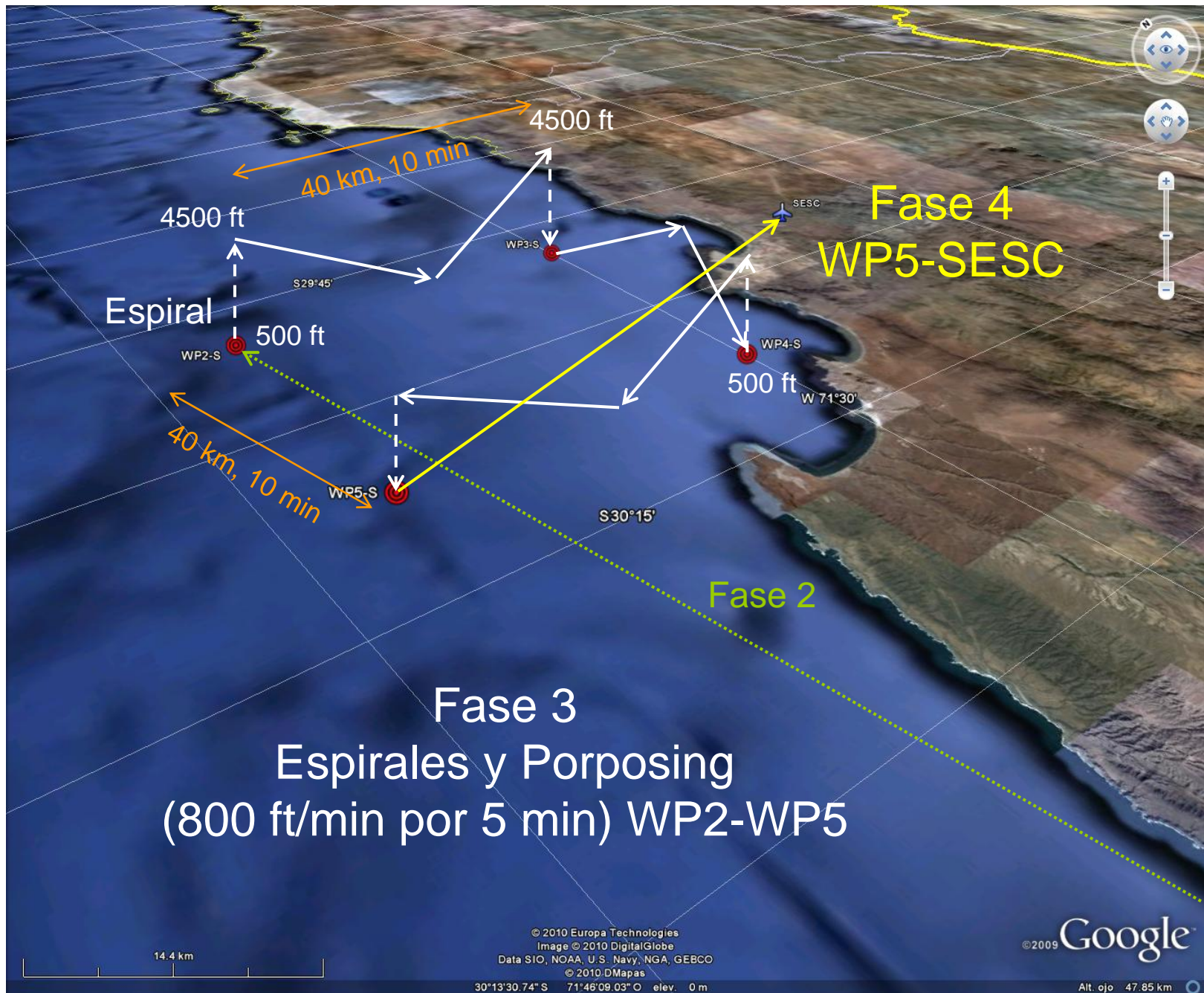
SQ1-Climatological near-coastal wind máxima around 30°S:

Structure? Wind-SST feedback or expansion fan Effect?

- Aircraft zonal coastal jet missions
- Radiosonde from R/V
- Modeling: control(?) + sens. runs

New Conceptual Model for Coastal Jet



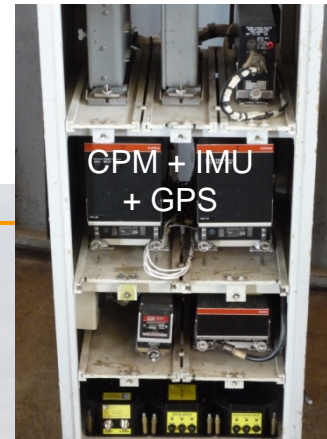


Fase 4
WP5-SESC

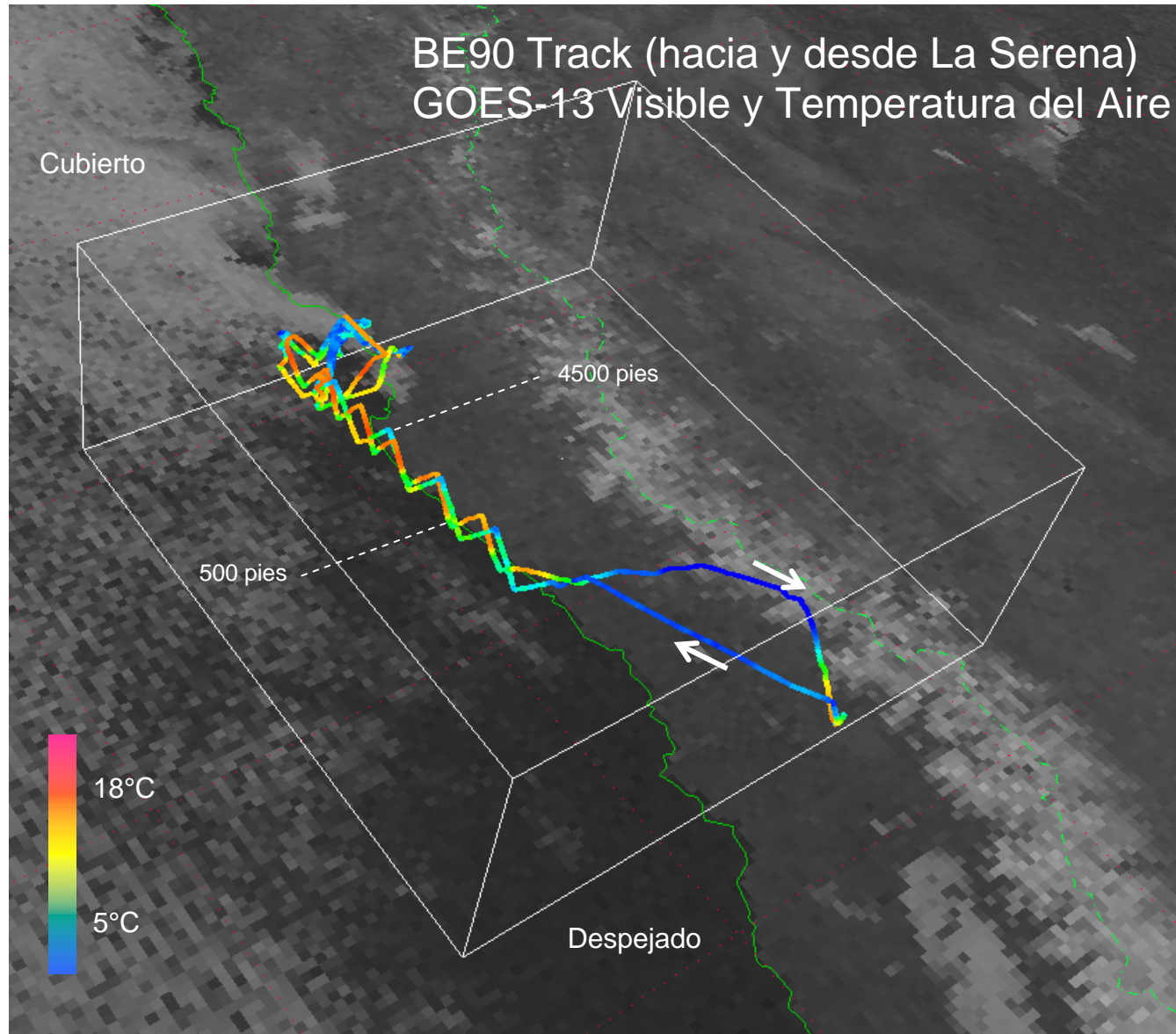
Fase 2

Fase 3
Espirales y Porposing
(800 ft/min por 5 min) WP2-WP5

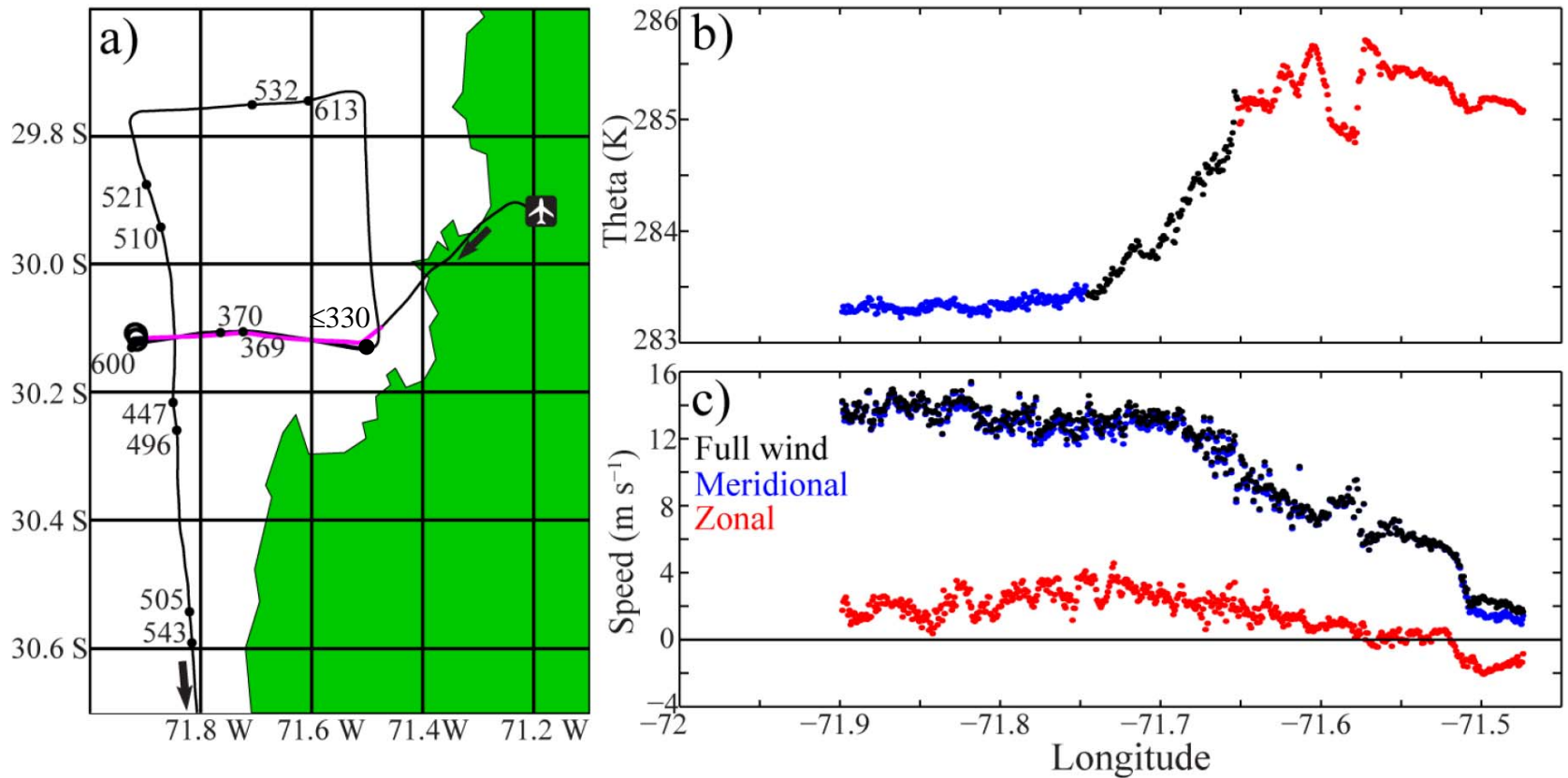
Proyecto AIMMS-20 en BE90



Misión Met-4



Misión Met-4



What next?...

Complete Data base (Radar, TSM, Islote Pajaros, etc...)

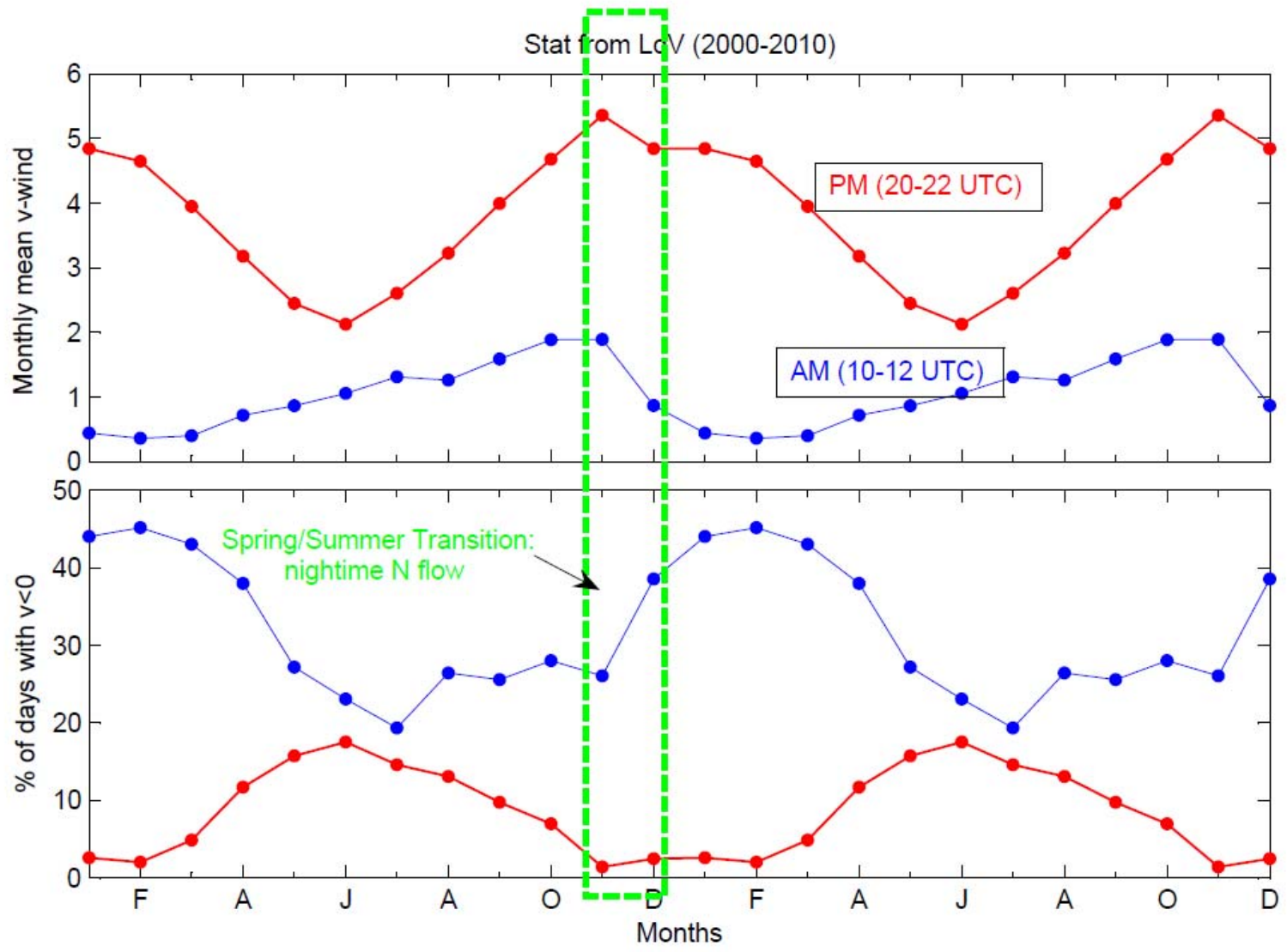
Mision BE90 - Tongoy

Overview paper (ACP)

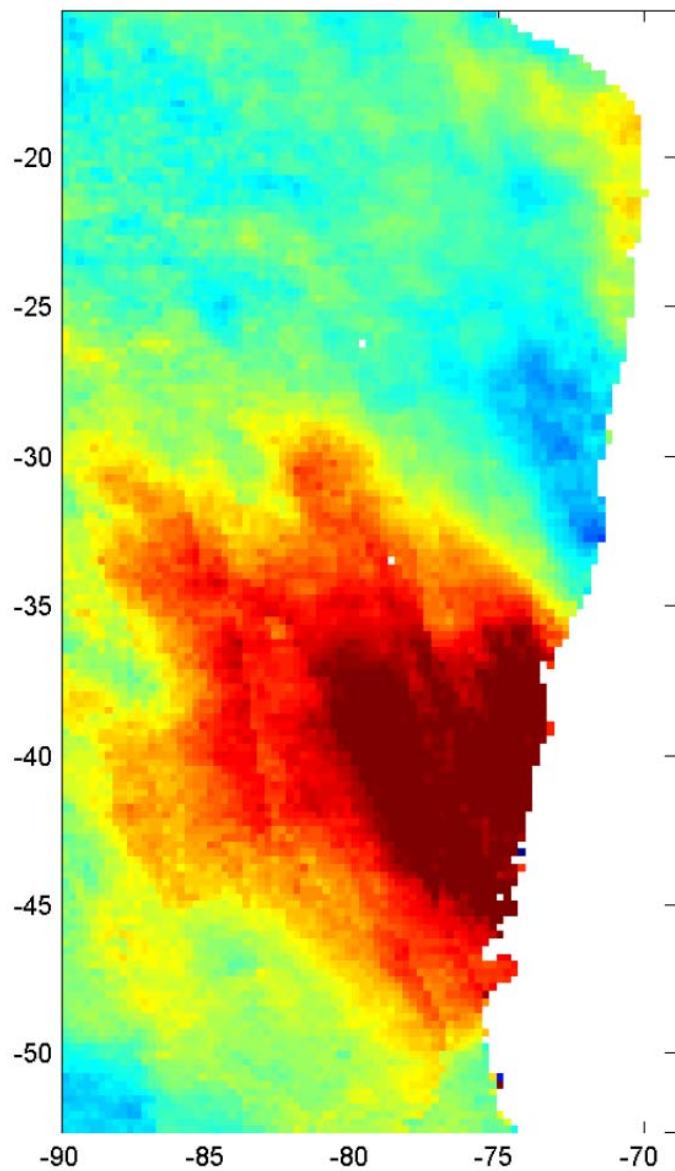
Specific papers



CUpEx II ?



d(v-wind) Dec-Nov, AM



d(v-wind) Dec-Nov, PM

