

## PW2.1

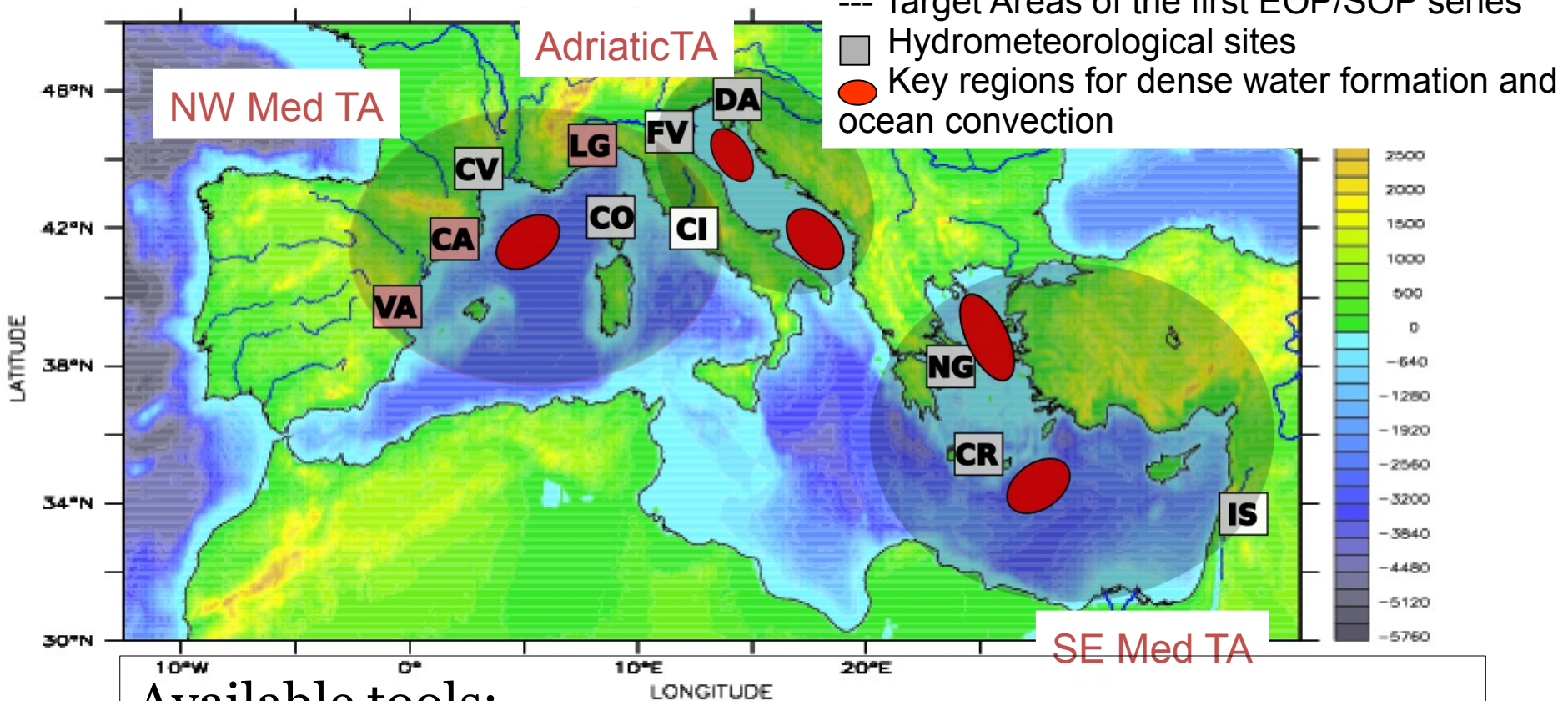
# Instrument deployment design over the Target Areas (Tas) during SOP/EOP: Mobile Platforms

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- Overview of available/anticipated mobile facilities
- Current plans for TAs
- Identification of gaps
- Strategy forward

✧ European Facility Airborne Research (EUFAR) support

6/18/10 ✧ Coordination with R/Vs (not discussed)



## Available tools:

### · Aircraft

- France: SAFIRE Falcon 20 & ATR-42
- Germany: KIT Dornier 128 & Consortium HALO (alt. DLR Falcon 20)
- US: NRL P-3
- UK: Bae 146

### · Super-pressurized balloons (Aeroclippers, BLPB)

### · Mobile radars

# TS5 - Aircraft & Payloads

- **SAFIRE Falcon 20**

- 4-channel AVAPS dropsonde data system and RD94 sondes
- RASTA radar (95 GHz), 3 or 4 pointing directions
- Microphysics (aerosol & ice clouds) package
  - **German consortium HALO**
    - KIT multi-sensor dropsonde system
    - DLR-IPA water vapour DIAL

- **SAFIRE ATR-42**

- 4-channel AVAPS dropsonde data system and 310 GPS sondes
- Water vapor DIAL LEANDRE 2
- ELDORA radar

- Community aerosol inlet
- **KIT Do 128**

- dropsonde data system
- Microphysics
- In situ turbulence probing system
- Turbulent fluxes

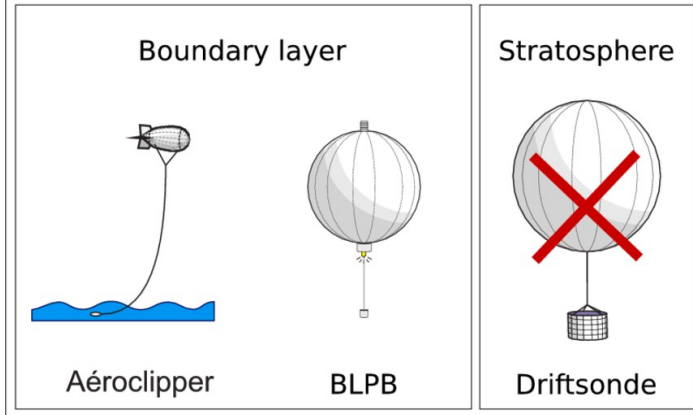
- **FAAM Bae 146**

- AVAPS dropsonde system
- Aerosols microphysics and optical characteristics
- Backscatter lidar

# TT01b - Sounding of the atmosphere

French **BAMED project** (*Balloons in the Mediterranean*) is presently the main component of TT01-b. BAMED is founded by CNES and LEFE. TT01-b is limited to French participants. BAMED has a link with Charmex (drifting platforms may be used in both experiments).

## Super-pressurized balloons



## Boundary Layer Pressurized Balloons (BLPBs and Aeroclipper)

- Balloons will be deployed during SOPs
- Launching sites for Autumn and Winter SOPs may be different.
- During a given SOP, no more than 2 sites, a single site would be preferable.
- BLPBs and Aeroclippers should be launched from the same sites.
- BLPBs are preferred for HPEs, Aeroclipper are fine for all weather cases

# TT01f - Radars

DOWs (CSWR)



RS DOW (CSWR)



SR-2 (OU)

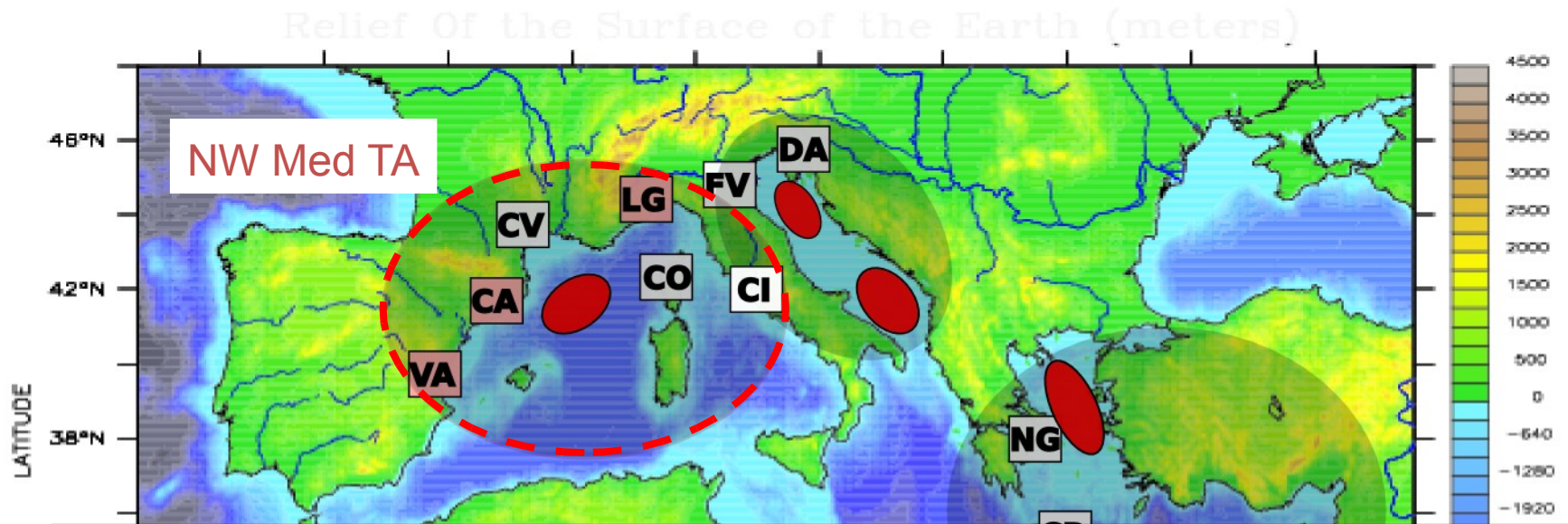


NO-XP (NSSL)



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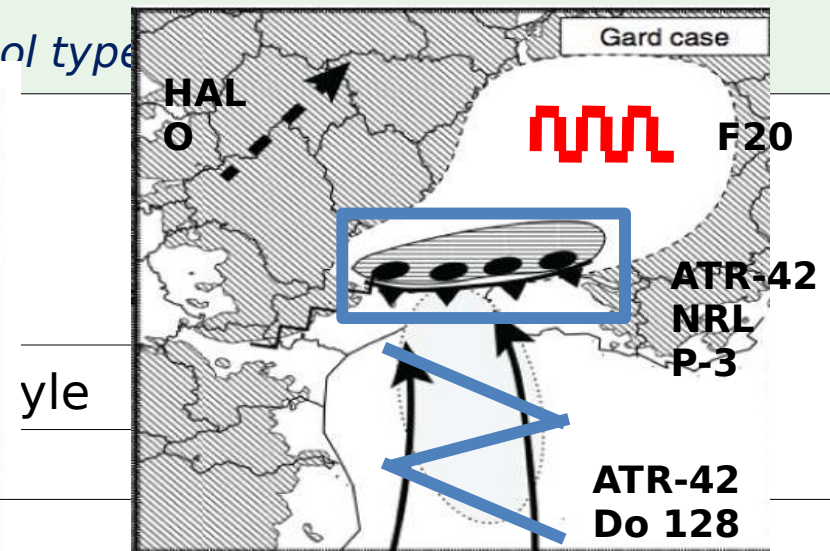
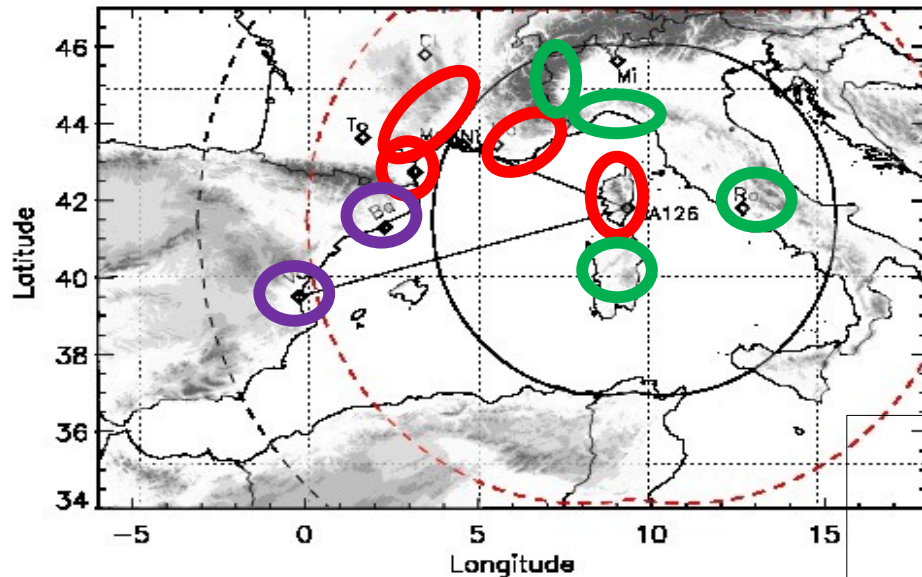


- 2 SOPs scheduled for 2012-2013 and 2013-2014
  - SOP 1.1 (fall 2012): Heavy Precipitation Events (HPEs)
    - Objectives are clear
    - Strategy for mobile facilities are currently being implemented
  - SOP 1.2 (winter 2013): Intense air-sea exchanges and strong winds
    - Objectives are not so clear
    - Strategy for mobile facilities have not been discussed yet

# High-precipitation events over orography in the northwestern Mediterranean SOP 1.1 - fall 2012

## Objectives:

- . Characterization of the Mediterranean inflow (structure, dynamics, thermodynamics) associated with Heavy Precipitation Events (HPEs) from CI to mature phase
- . Characterization of the dynamics and ice clouds properties in the stratiform region of MCSs
- . Aerosol-cloud interactions: impact of aerosol type



- › France: SAFIRE Falcon 20 & ATR-42
- › Germany: KIT Dornier 128 & Consortium HALO
- › US: NRL P-3
- › UK: FAAM BAe 146???

- ✧ BAe 146: E. Defer will fly an instrument on BAe, ESA funding for CAL/VAL during HYMEX
  - this opens other EUFAR perspectives (aerosol microphysics or lightning oriented proposals)

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 ✧ There is room for other EUFAR proposals, as for example over **Central Italy** in connection with the orographic rain project

# Balloon strategy

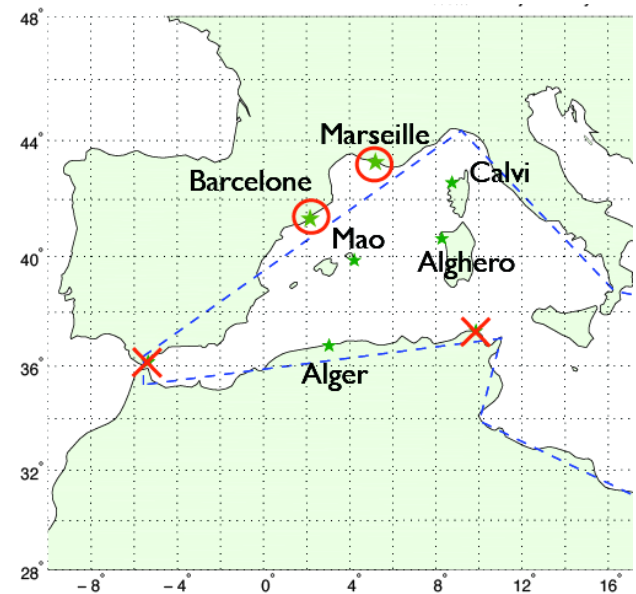
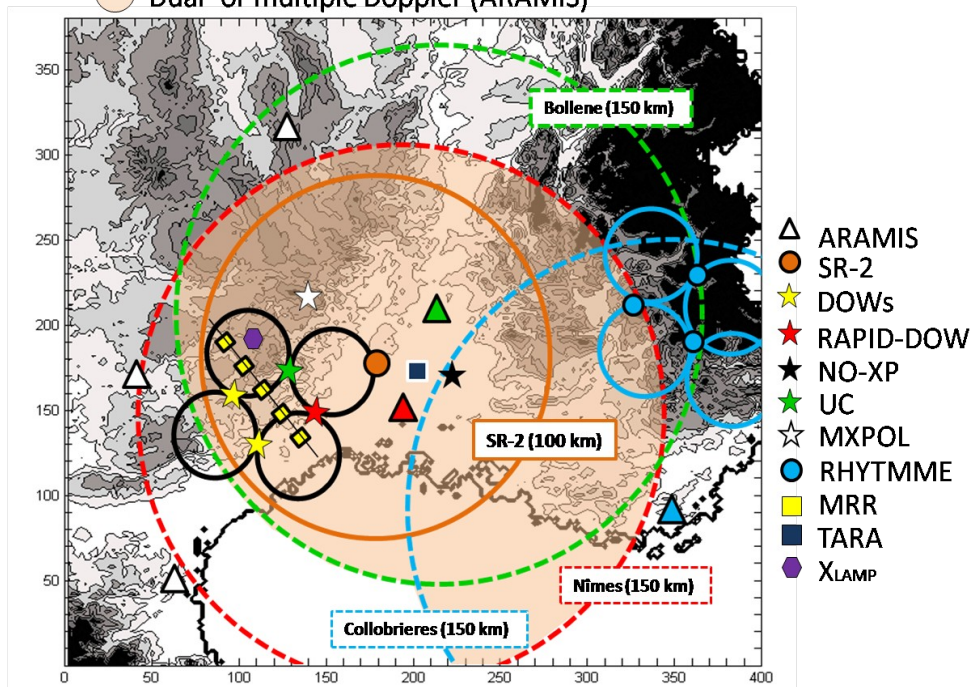
## Deployment strategy:

0 BLPBs and 30 Aéroclipper are planned for HyMeX

OP 1-1 (Autumn 2012) : 15 BLPBs & 10 Aéroclippers

# Mobile radar strategy

- Dual-Doppler (50km)
- Dual- or multiple Doppler (ARAMIS)



We must be prepared to move ground based research facilities to other regions of the TA if needed (Liguria, Cataluña and SE France)

WNot so many “mobile” facilities

□ Liguria/Barcelona only on 12-h notice

□ Group meeting to design the mobile network and relevant science

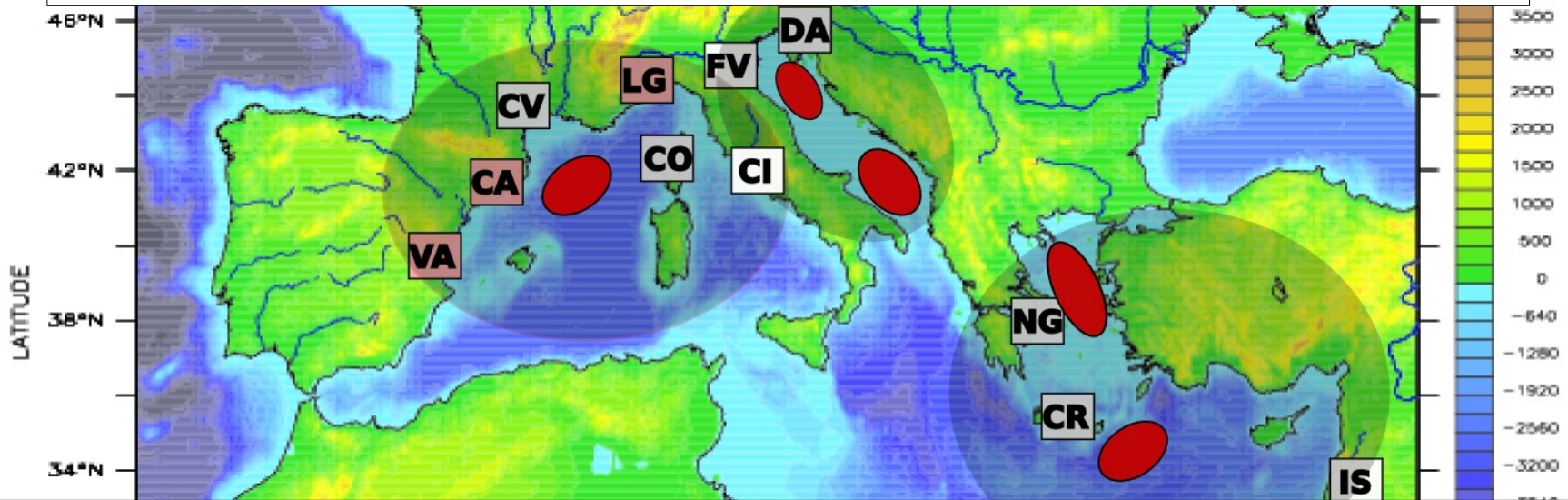
□ US objectives: coordination between a/c and ground-based facilities is key

→ Discussion with other network

→ **Need for a RADAR meeting soon!**



# High-precipitation events over orography in the Adriatic TA & in the SE Med TA



• What are the needs in these TA?

- ❖ **Adriatic: Friuli & maximum of precip over N. Adriatic** in fall– 2 important areas to work on using aircraft: characterization of low-level inflow most interesting; MCS anvils less of interest
- Difficulty in addressing these issues in 2012 if a/c are based in SE France • 2013??

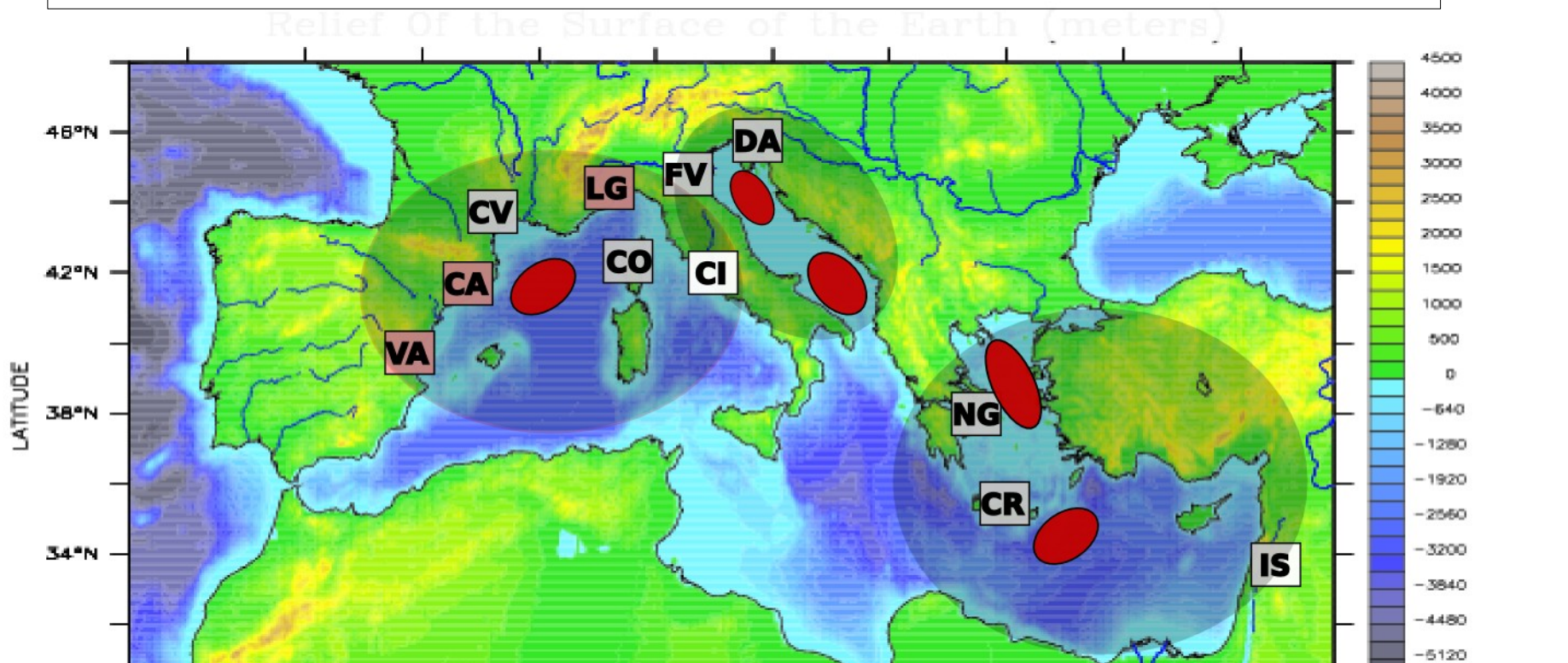
**EUFAR proposal??**

- ❖ **SE Med : Crete** in Nov/Dec timeframe
- Need for a 2nd mobile radar:
  - internal NOAA funding (James G.); proposal will need to be oriented towards microphys retrieval & hydrolog application
  - NSF competitive prog : next call in January 2010 to be ready in 2012
- Need for aircraft operations: upstream of western Crete as there is no RDS
  - dropsondes: moisture, temp. profiles
  - cloud microphysics

➢ PBL structure over the sea □ lidar  
**Planning of operations: 2013 or 2014 in a/c are involved (EUFAR)? Earlier if only radars are involved.**



# Intense air-sea exchanges and strong wind events in all TAs



- All TAs: Cyclogenesis

Impact on air-sea exchanges & marine PBL structure  
Impact of aerosol properties on life cycle  
Role of ice hydrometeores

- NW Med TA: Cierzo, Mistral, Tramontane?

- Adriatic TA: Bora over southern Adriatic & Sirocco (moisture inflow)

- SE TA: Etesian?

3D structure of the flow

Impact on air-sea exchange & marine PBL structure

**Strong winds** (need for a combination of a/c & pressurized balloons)

Med TA:

- 1. Release of balloons from the coast in the **Mistral and Tramontane** flows  
+ a/c moisture observations
- New insights into air/sea exchanges processes over the GoL

2. Orography-induced winds around Corsica: tip jets?, etc...

Adriatic TA:

- 1. Southern Adriatic Bora (north covered): less frequent but severe  
Dinaric Alps are broader and steeper close to the coast  
Less obs in that region  
Bora blows from Nov. to April: March very favorable

- 2. warm moist Sirocco wind in S. Adriatic    convective initiation in N. TA
  - Aircraft operations (aerosol lidar, dropsondes, Doppler wind lidar??)
  - Balloons are also interesting for connecting to oceanic measurements

**EU-FAR Proposal!! Operations during or after SOP 1.2**

Med TA:

- 1. Etesian winds: release of balloons from the coast in the **Etesian** flows  
→ New insights into air/sea exchanges processes over the Aegean Sea
- 2. Strong winds in the open area between Crete and S Peloponnese
  - ✦ Impact on the PBL □ aerosols lidars, dropsondes
  - ✦ Upwind conditions as far West as Sicily (big water mass between Sicily and Crete)
  - Pressurized balloons released from Sicily (e.g. aeroclippers)

## II- Cyclogenis (need for a combination of a/c & pressurized balloons)

Of interest are:

- Cyclones forming in the Western part (GoL) and travelling eastward: several such cyclones may be observed over the whole Mediterranean in a period of 10 days
    - Cyclones forming over the G of Liguria and moving inland (flooding in Austria)
  - Pair of cyclones forming over the N Tyrrhenian and Adriatic seas and moving southwards simultaneously
  - Cyclones forming over the G of Liguria, moving S over the Tyrrhenian and into Aegean sea
  - Sharav cyclones forming in the lee of the Atlas and moving over the SE Med TA
- ❖ lack of data in the PBL and in the upper levels **around and upstream** of Mediterranean cyclones, over the sea, but also over land
  - ❖ need for accurate moisture measurements and documentation of dry intrusions from the stratosphere
  - ❖ need for enhanced knowledge on mesoscale dynamical processes such as sting jets

□ Surface, PBL and vertical profiles are highly desirable

**Dropsondes ARE a crucial aspect of the a/c detachment!!**

**The project has to endorse the responsibility of negotiating with ATCs**

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Strategy: