Data Assimilation aspects and the HyMeX* campaign

DAOS 5th Meeting, Madison, Wisconsin, USA
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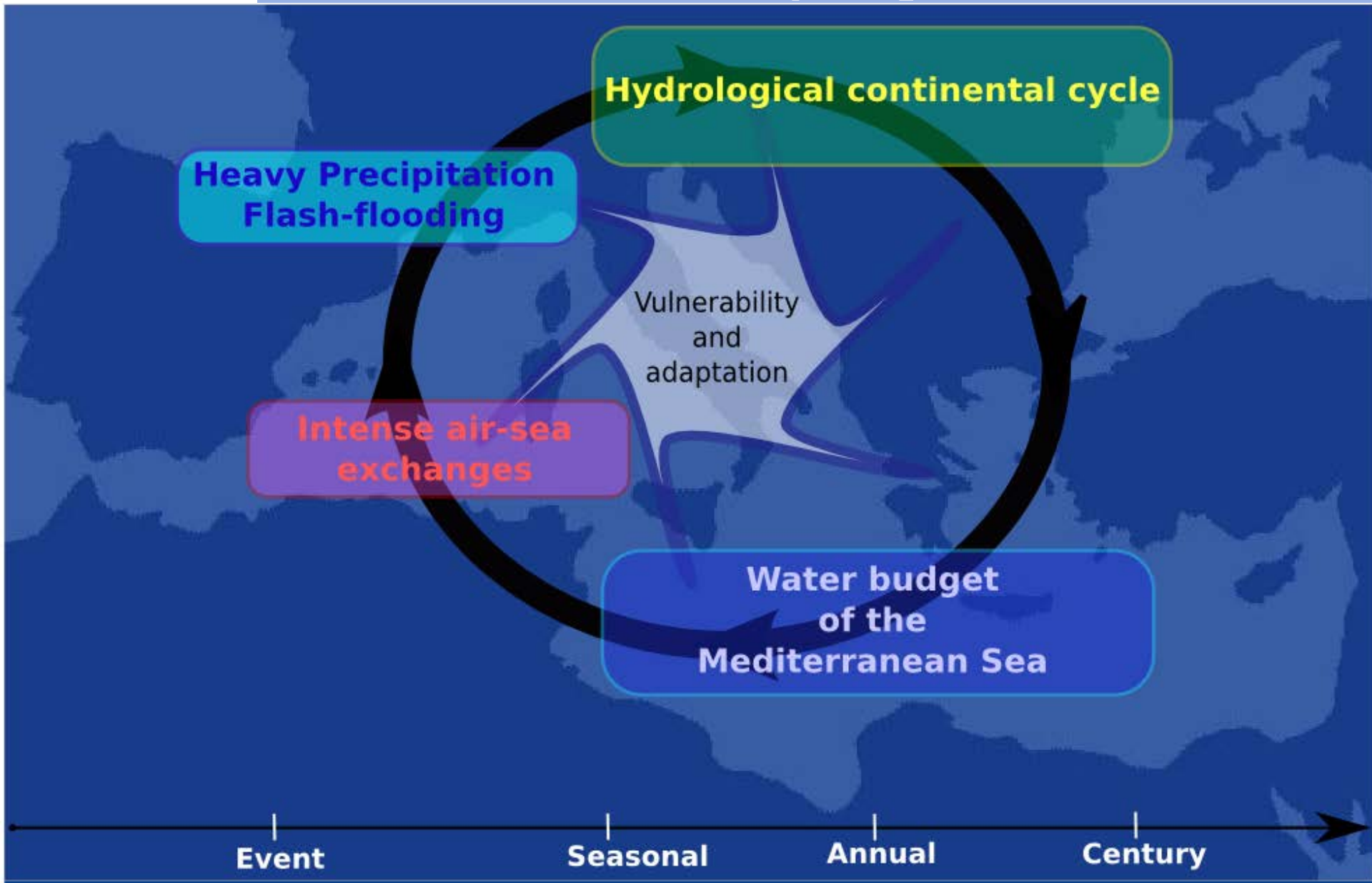
*Hydrological cycle in the Mediterranean eXperiment

HyMeX objectives

Scientific topics



HyMeX objectives
Scientific topics

Mesoscale convective systems
Slow-moving frontal systems
Coastal orographic precipitation

Hydrological continental cycle

Heavy Precipitation
Flash-flooding

Intense air-sea exchanges

Better understanding of the ***intense events***:
processes and contribution to the trend

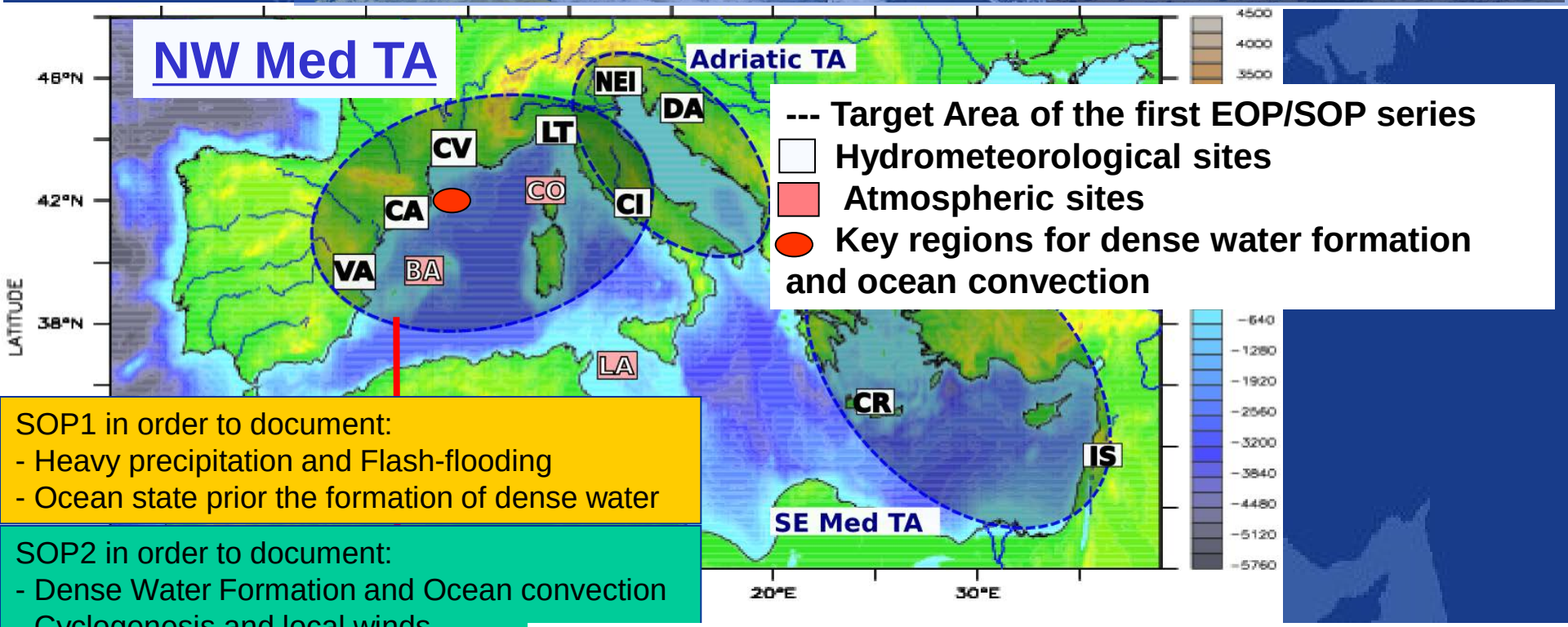
Mediterranean cyclogeneses
Regional winds
(Mistral, Bora, Tramontana)

Key questions:
What are the ingredients and their interactions necessary to produce an extreme event ?
What will be the evolution of intense events with the global climate change ?

Event | Seasonal | Annual | Century

HyMeX

Observation Strategy (Focus on NW Med TA)



--- Target Area of the first EOP/SOP series

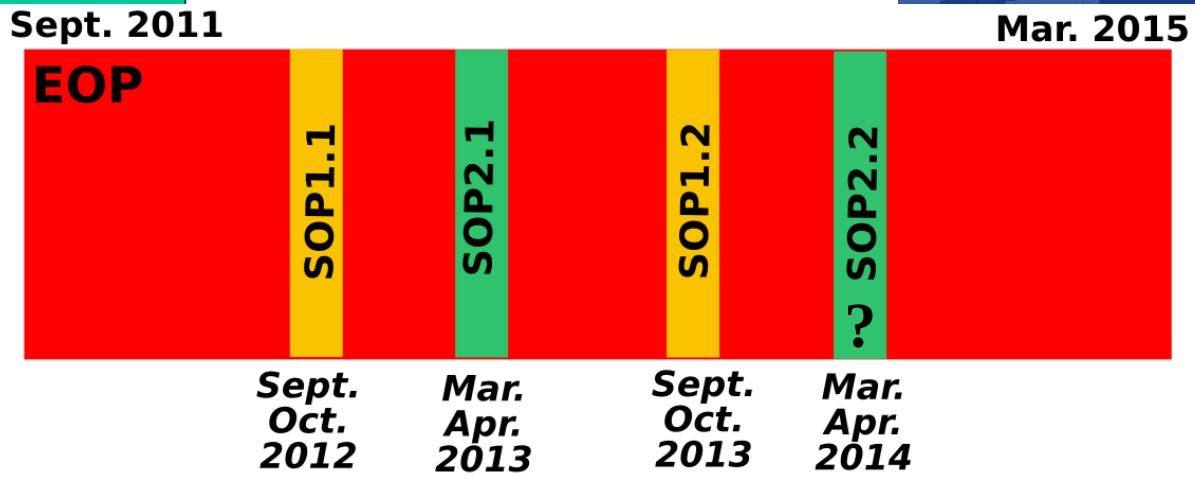
Hydrometeorological sites

Atmospheric sites

Key regions for dense water formation and ocean convection

SOP1 in order to document:
- Heavy precipitation and Flash-flooding
- Ocean state prior the formation of dense water

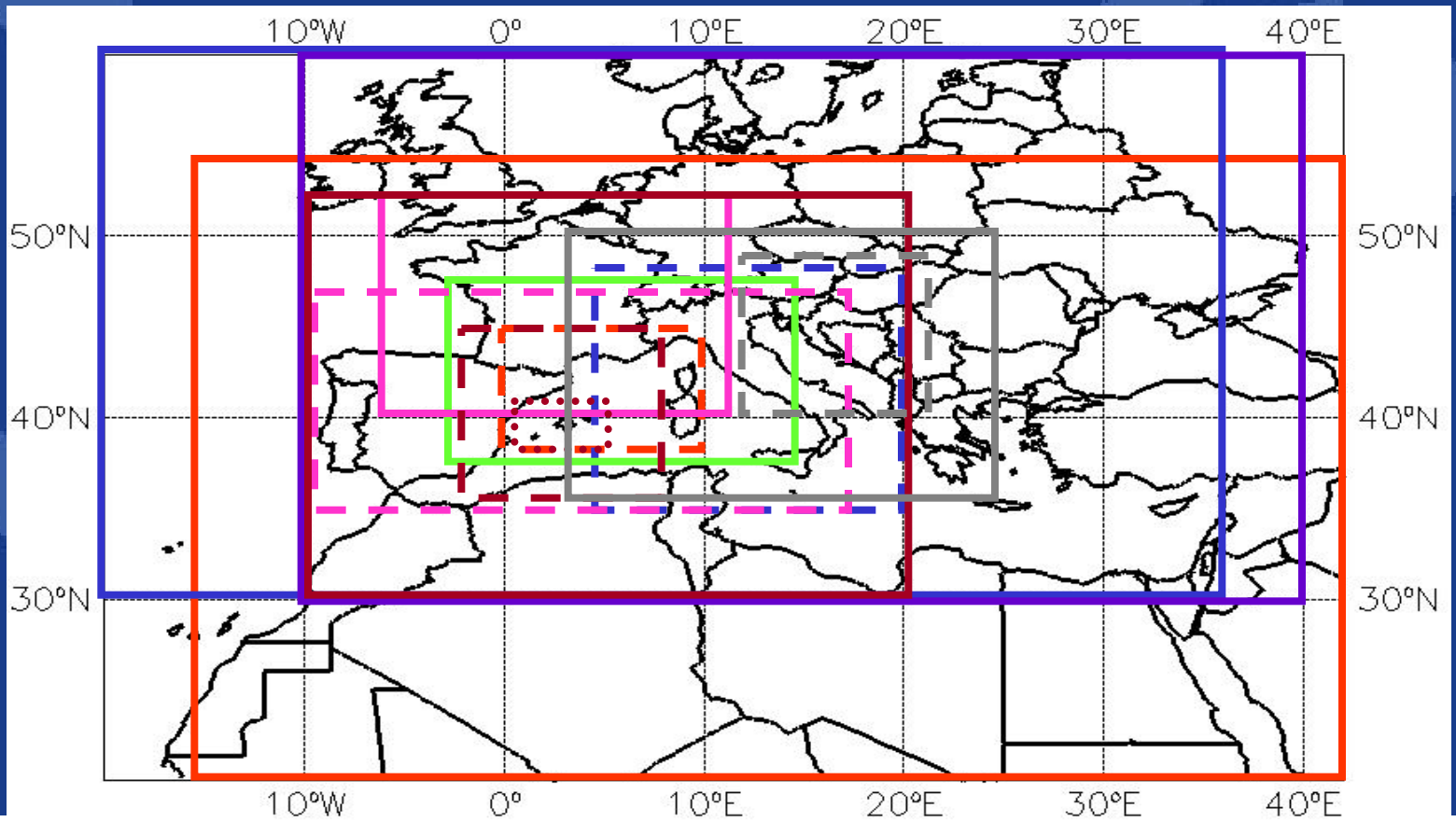
SOP2 in order to document:
- Dense Water Formation and Ocean convection
- Cyclogenesis and local winds



HyMeX

TS7: Real-time modelling forecast during SOP/EOP

Real-time atmospheric models to guide observation deployement (available at the HOC)



AROME_FRANCE (2.5km)
AROME_WMED (2.5km)
BOLAM (15km)
(**BOLD**, with assimilation cycle)

WRF-MED1 (50km)
WRF-MED2 (7km)
BOLAM (11km)
MOLOCH (2.7km)
MESO-NH (2.5km)

MM5-D1 (22.5km)
MM5-D2 (7.5km)
MM5-D3 (2.5km)
ALADIN-HR (8km)

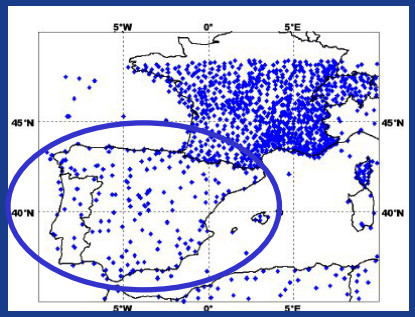
AROME-WMED: Data Assimilation

Assimilation scheme:

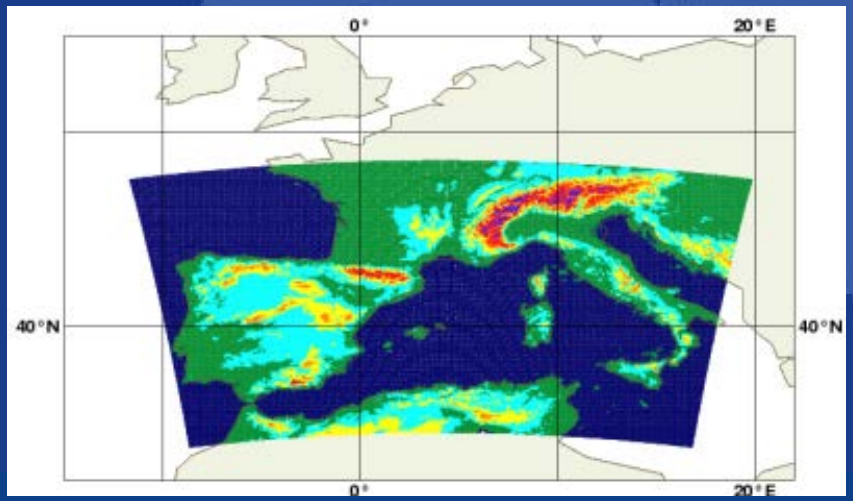
3D-Var at 2.5km, assimilation window 3h, 48H forecast range

Assimilated observations:

- Conventional data : surface data, wind profilers, radiosondes
- Ground-based GPS stations
- Satellite radiances from geostationnary and polar-orbiting satellites
- Radar doppler winds and reflectivities (1D+3D-Var of RH profiles)
- Wind derived from satellite imagery



Additional SYNOP provided by Spain

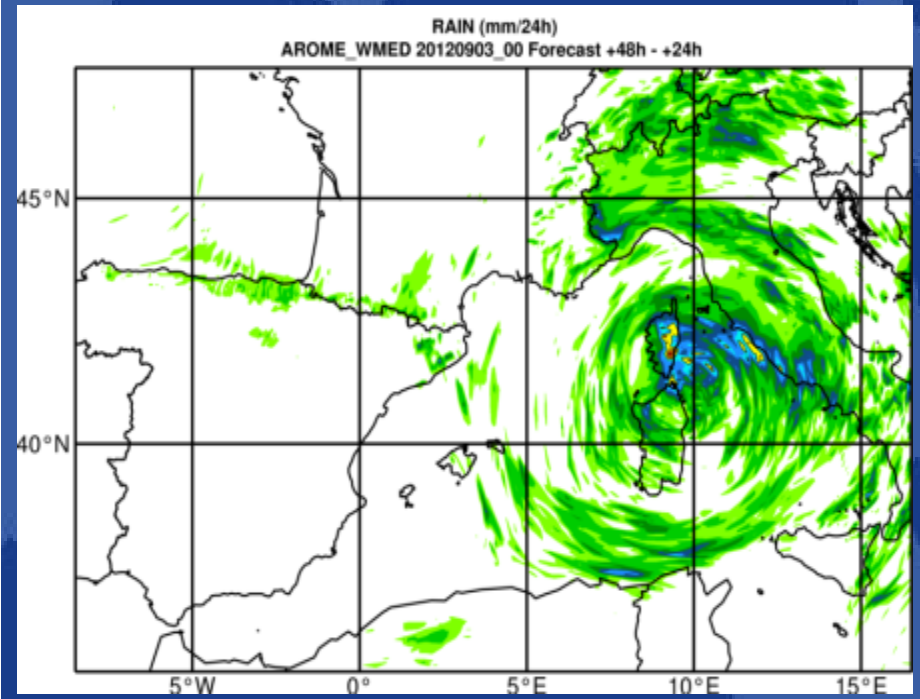


AROME WMED
960x640 points

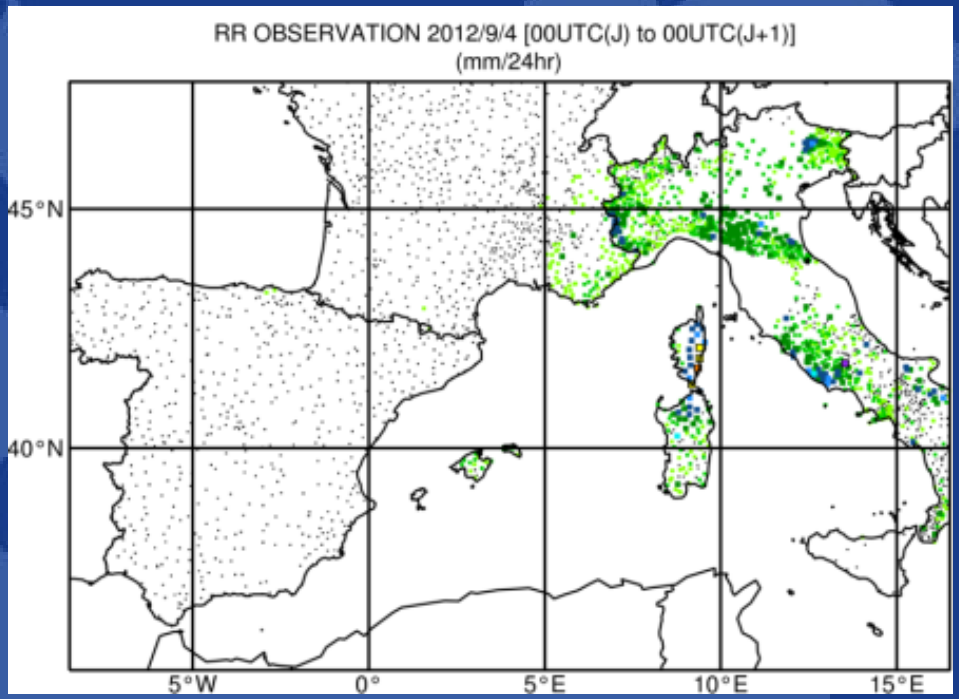
HyMeX

Daily update on web site http://sop.hymex.org

Predicted rain 24H



Rain Rates obs. rain 24H



Treatment of spanish, catalan and italian SYNOPS

Facility Status

HYMEX Operating Center

HyMeX

◀ 14 September 2012

Home>

aircraft - research radars - Wind Profilers - Radiosoundings - Candillargues supersite - Lightning - Corte supersite - San Giuliano supersite - Corsica atm site - HPICONET - CV site - Balloons - Balearic site - Central Italy - Lampedusa - Northeast Italy - Surface Drifters - Surface Buoys - Gliders - Ship - Argo floats - Ship_of_opportunity -

Measurements monitoring

<< September 2012

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2	3	4	5	6	7	8
9	10	11	12	13	**14**	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

IOP4 HPE/FFE-CI: Fri. 14 Sep.

- Home
- News
- Logistics

- Reports
- Models
- Observations
  - MCS tracking
  - Satellite products
  - GPS
  - Radars
  - Discharges
  - Lightning
  - Surface stations
  - Radiosoundings
  - BLP Balloons
  - Wind profilers
  - Lidars & Radiometers
  - Aircraft data

Date:	Sep 04	05	06	07	08	09	10	IOP1 11	IOP2 12	IOP3 13	IOP4 14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Oct 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
aircraft																																										
AMS - SAFIRE/ATR42							A	A	A	A	A																															
Dropsondes - KIT/DO128																																									
Dropsondes - SAFIRE/Falcon										A	A																														
KIT/DO128 (flight hours)																																									
LEANDRE II - SAFIRE/ATR42					A	A	A	A	A	A	A																															
Meteorological sensors - KIT/DO128																																									
Microphysics - SAFIRE/Falcon										A	A																														
RASTA - SAFIRE/Falcon					A	A	A	A	A	A	A																															
SAFIRE/ATR42 (flight hours)										A	A																														
SAFIRE/Falcon (flight hours)										A	A																														
Turbulence - SAFIRE/ATR42					A	A	A	A	A	A	A																															
research radars																																									
La Bombine LAMP-radar				A	A	A	A	A	A	A	A																															
Le Chade LAMP-radar																																									
mobile NSSL-radar																																									
Montbrun EPFL-radar										A	A																														
NE Italy -radar																																									

The campaign has started!

Already 4 IOPs for heavy precipitating events over Italy

HyMeX

13 September 2012

<< September 2012

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2	3	4	5	6	7	8
9	10	11	12	**13**	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
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IOP4 HPE/FFE-CI: Fri. 14 Sep.

Home
News
Logistics

Reports
Models
Observations
MCS tracking

Home>Models>Atmospheric models>Convection-permitting models>Ensemble forecast>Arome EPS 2.5km>Probabiliti

Probabilities RR24, Quantiles RR24, Quantiles RR1, Probabilities dBZ, Stamp maps RR24, Stamp maps dBZ, Probabilit

Arome EPS: 10-m wind probabilities from 18 UTC run

15 Sep 2012 00h UTC