WG3 Heavy precipitation, flash-floods and floods

Guy Deltrieu (Grenoble), Alberto Montanari (Bologna), Romualdo Romero (Palma), Evelyne Richard (Toulouse)

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Scientific questions

- What are the characteristics of extreme hydro-meteorological events in the Mediterranean?
- How can we improve heavy rainfall process knowledge and prediction?
- How can we improve hydrological process knowledge and flash-flood/flood prediction?
- How extreme hydrometeorological events will evolve under future climate conditions during the XXIst century?
Hydrologic response time of Mediterranean watersheds

- Marseilles urban watersheds
- High-mountain Italian basins
- Medium-mountain Cévennes watersheds
- Rhône and big tributaries

Spatio-temporal scales
- Thunderstorm: 10-30 min
- Mesoscale Convective System: 1-2 hr
- Frontal System: 2-3 days

Hydrologic response time as a function of watershed area:

- 10 km²
- 100 km²
- 1000 km²
- 10000 km²
- 100000 km²
- 1000000 km²
Maximum specific discharge as a function of watershed area
Low frequency and localized events, with some well-known regional “spots”

- ensure a good level of observation based on existing operational systems and hydro-meteorological observatories and their enhancement during LOP/EOP

- conceive instrument deployments that allow to maximize the chance to catch several intense events during the 2-month SOPs

- fill in the observational gaps over the sea to document the initial development of precipitating systems and the upwind offshore moist flows that feed these systems.
Target areas and sites

Bassin versant méditerranéen

- CV
- LG
- FV
- DA
- CA
- VA
- CR
- IS

Legend:
- Bassin méditerranéen (NV)
- Niveau national (N1)
Observational strategy

1. Set up hydrometeorological observatories
Collation, critical analysis and elaboration of hydrometeorological products from operational observation systems.
operate and reinforce a set of complementary **pilot-sites** devoted to hydro-meteorological process studies and multi-disciplinary integrative studies (risk assessment and water resources at the regional scale...)

e.g. the Ardèche watershed

Hydrometeorological observatories

- Hourly Raingauges
- Radars (Météo-France)
- Disdrometers
- Stream Gauges
- LSPIV sensors
- Mobile X-band radars
- New LSPIV sensors
- New Stream gauges
- Piconet site

Improve instrumentation and modelling
Room for other pilot-sites: urban, high-mountainous, island, semi-arid...
Be organized to perform **post-event surveys** after the most extreme events wherever they occur in the Mediterranean during the EOP/LOP.

18 September 2007 in Zelezniki, Selska Sora river, Slovenia

HYDRATE project
Large scale environments propitious to HPE are relatively well known ... but precise location or precise amount of HPE are still very inaccurate

24h precipitation forecast  20 Oct. 2008
Multiple driving processes

How do they combine and interact to make a precipitation event a HPE?
Observational strategy

1. Set up hydrometeorological observatories

2. Make an optimal use of existing networks (RS, GPS, radar, lightening...)
Existing meteorological observation networks will form the backbone of the observation strategy to characterize the Heavy Precipitation Events (HPE) meteorological environment at the synoptic and meso scales (RAOBS, AMDAR, weather radar, ground-GPS, Lidar, lightning,...):

- Facilitate access to the data
- Enhancement of the frequency
Observational strategy

1. Set up hydrometeorological observatories
2. Make an optimal use of existing networks (RS, GPS, radar, lightening...)
3. Complement the observations over the sea
• Monitoring of upstream conditions from 2 islands supersites

• Deployment of instrumented balloons

• Deployment of research aircraft
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Aircraft operations
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Aircraft operations

Lazzio

Barcelona