

CEDIM Forensic Disaster Analysis Group (FDA)

High Impact Weather - Mediterranean Sea, Alps – Short Summary

24 November 2014 – Report No. 1 – 22:00 GMT

Authors: Bernhard Mühr, Marcel Buchholz, Sven Baumstark, Florian Becker

SUMMARY

| Named low pressure systems | Date | Impact | Local | Duration |
|----------------------------------|--------------------|---------------------|-----------|---------------|
| Quendresa I | 04/05/06-11 | intermittent | +1 | 2 days |
| Roswitha, Stephanie II | 10/11/12-11 | intermittent | +1 | 3 days |
| Stephanie I, Thea, Thea I | 15/16-11 | intermittent | +1 | 1 day |

Preferred Hazard Information:

| Location | windspeed, gusts | Max 24h rain | Max 72h rain | Rain amount Nov 1-18 | Nov average | Departure from normal |
|--------------------------------|------------------|---------------|---------------|----------------------|---------------|-----------------------|
| Genoa (Sestri) (IT) | | 159 mm | 282 mm | 585 mm | 111 mm | 527% |
| Rome (Ciampino) (IT) | | 118 mm | 128 mm | 193 mm | 130 mm | 148% |
| Milan (Linate) (IT) | | 102 mm | 115 mm | 272 mm | 101 mm | 269 % |
| Locarno (Monti) (CH) | | 140 mm | 273 mm | 684 mm | 162 mm | 422 % |
| Robiei (CH) | | 134 mm | 256 mm | 735 mm | | |
| Lugano (CH) | | 109 mm | 188 mm | 537 mm | 127 mm | 423 % |
| Luqa (MT) | 118 kph | | | | | |
| Lampedusa e Linosa (IT) | 135 kph | | | | | |
| Chamrousse (FR) | 206 kph | | | | | |
| Gütsch (CH) | 181 kph | | | | | |

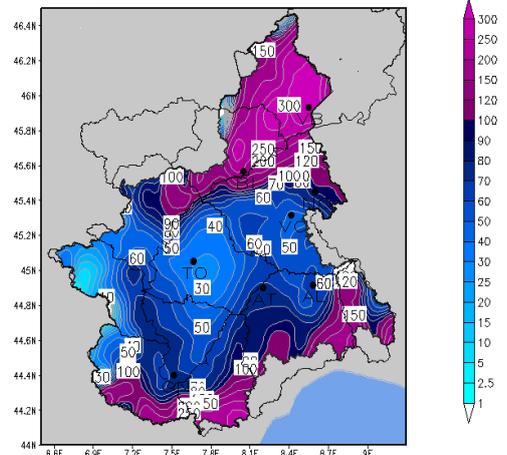
Location Information:

| Country | ISO | Provinces/ Regions |
|--------------------|-----------|--|
| France | FR | Provence-Alpes-Cote d'Azur, Languedoc-Roussillon |
| Malta | MT | |
| Switzerland | CH | Ticino |
| Italy | IT | Lombardy, Piedmont, Liguria, Trentino-Alto Adige, Tuscany, Friuli-Venetia, Sicily |

Preferred Hazard Information Description:**On 4-6 November**

- A large upper level trough began to stretch southwards across the Iberian Peninsula into north western Africa. Ahead of this trough the surface low “Quendresa I” started to form and travelled eastwards slowly. Warm air from the south took enormous amounts of moisture from the still pretty warm water of the Mediterranean Sea. The continuous flow of the moisture laden air against the Alpine and Cevennes mountains led to record breaking rain amounts.
- 400 mm rain (36 h) in the Department Ardeche (FR), 145.6 mm rain fell in Nice (FR) which was a new all time record for daily rain amount in November. Meteo France considered the rain amount in the Bourgogne as “once in a century”.
- 430 mm rain (50 h) at the Plöckenpass (Austrian-Italian border), in north eastern Italy (Malga Valine) 689 mm of rain fell within 48 hours!
- On top of Eggishorn (2893 m, CH) snow accumulation was 90 cm within 15 hours.
- Due to strong pressure gradients the Foehn wind evolved and reached wind speeds of up to 206 kph (Chamrousse, FR). Many exposed stations recorded > 150 kph (e.g. Gütsch (FR), Zugspitze (DE).
- Also heavy rainfall and flooding in other regions of Italy, e.g. Liguria, Tuscany, Sicilia, Latium (Rome 118 mm in 24 hours), Slovenia.

Precipitazioni (mm/48hr) ultime 48 ore
Dato aggiornato al 05-11-2014 ore 16 UTC



Dati ed Elaborazioni – Arpa Piemonte
**48 hours rain sum in Piedmont (IT),
03-05 Nov 2014, 16:30 UTC**
Source: ARPA Piemonte

On 7 November

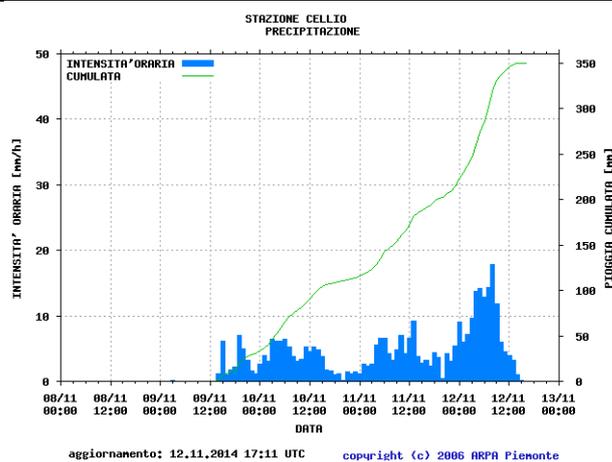
- Due to a cut-off process the trough remained as an upper level low between Tunisia, Libya and Southern Italy. The associated low pressure system turned into a “medicane”, a mesoscale storm system featuring both tropical and extra-tropical characteristics.
- The storm moved with its center close to the east coast of Sicily northwards.
- Luqa (MT) recorded an air pressure value of 984 hPa and gusts of 118 kph, the island of Lampedusa (IT) 133 kph, Kasserine (Tunisia) 105 kph.
- 215 mm rain (48 h) in Palazzolo Acreide, Sicily (IT), Lingualossa (Etna Nord) recorded 452 mm (48 h).



**Satellite image MODIS-Aqua
07 November 2014**
Source: NASA Earthdata Worldview

On 9-13 November

- From 9 November onwards a new upper level trough over western Europe initiated cyclonic activity across the western and central Mediterranean Sea. The surface low pressure systems “Roswitha II” and “Stephanie II” caused heavy precipitation mainly of convective type from Algeria to Sardinia, Corsica, southern France, Liguria and central Italy. Towards the Alps rain accumulation again was in the order of several 100 mm.
- In Alpine valleys Foehn caused storm gusts and temperatures above 20°C.
- Altdorf (CH) 98 kph, Patscherkofel (AT) 140 kph.
- Genoa (IT) 282 mm (72 hours), Alpicella (IT) 240 mm (38 hours), Cellio (IT) 350 mm (72 hours).



Precipitation at Cellio (IT), 8-12 November 2014
Source: ARPA Piemonte

On 14-16 November

- In the course of 14 November a long wave trough triggered a new surface low that developed over Spain. During 15 November it moved to southern France and finally into northern Italy. Moist and warm airmasses were carried against the Alps again resulting in intense rain in southern France, north western Italy and Ticino. Large atmospheric instability over warm waters created heavy convective precipitation in parts of Liguria and in the Cevennes mountains.
- In Gard and Ardeche departments (FR) > 200 mm (24 h).
- At Passo di Giovi near Genoa (IT) 361 mm within 12 hours, Genoa reported 159 mm (24 hours).



Precipitation radar France
14 November 2014, 22:15 UTC
Source: infoclimat.fr

Impacts on transportation, infrastructure and losses

4-6 November 2014

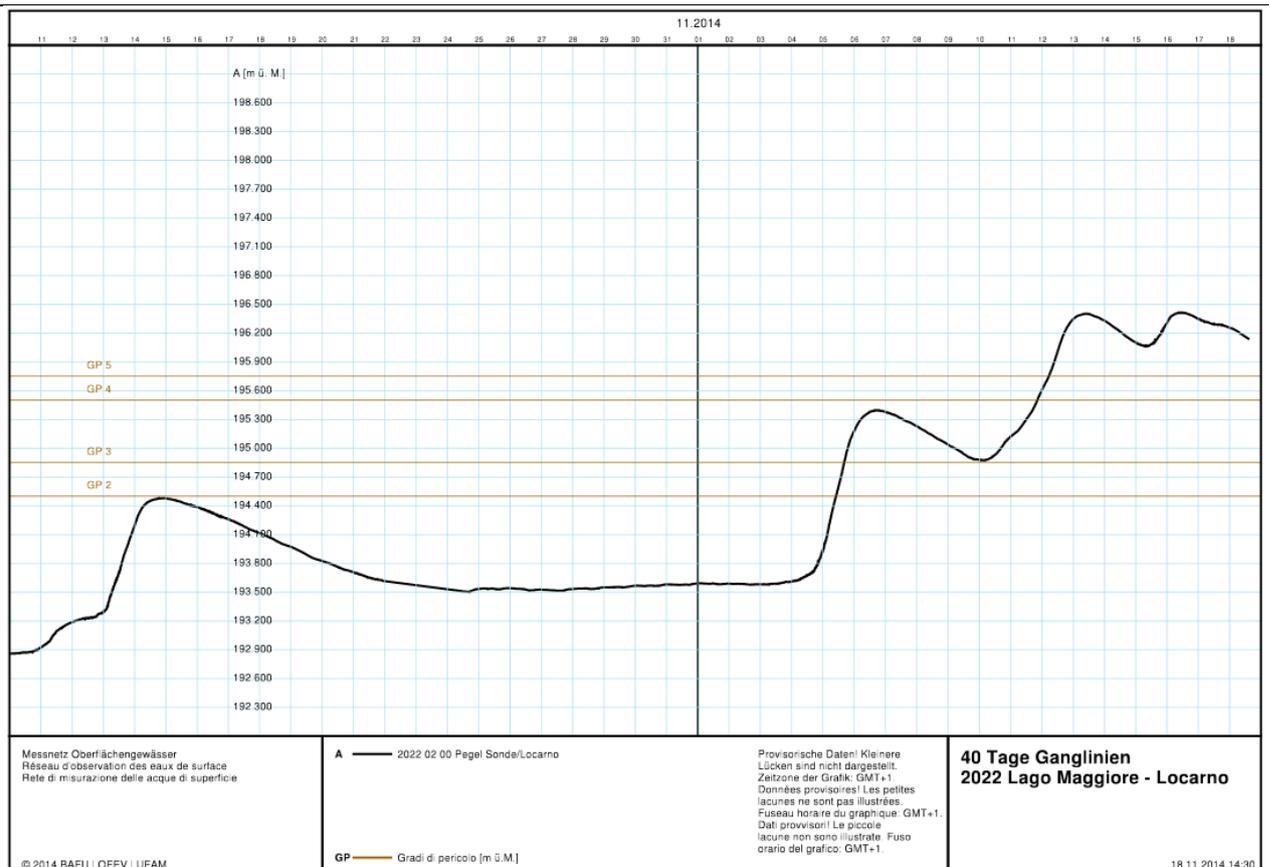
- Concentrated efforts of the fire brigades (1500 operations), 6500 households without electricity.
- Highway A47 between Lyon and Saint-Etienne closed for 16 hours, railway transportation interrupted.
- Montpellier was struck by flooding for the third time in autumn 2014. Cars washed away, many people evacuated into shelters.
- Cote d'Azur close to Nice: A woman died due to a mud flow, mud blocked the highway N°8, no air traffic for 2 hours.
- In Bozen (South Tyrol, IT) some flights were cancelled.
- Flooding in Rome (IT), schools and sights closed, metro stations flooded.
- In Carrara (Tuscany) many basements and undercrossings flooded, due to crevasses water was meters high in parts of the city, also high water level and flooding in Venice (IT).

7 November 2014

- Significant wind damage along the east coast of Sicily.

9-13 November 2014

- Flooding in Liguria and Piedmont (IT), landslides, road and rail traffic interrupted
- In Leivi near Genoa 2 people died when a mud flow buried a house, death toll in northern Italy rose to 5 so far.
- Damage > 100 Mio € in Piedmont.
- Water level of Lake of Lugano exceeded danger level 4, Lake Maggiore level 5.
- Flooding in parts Locarno (CH), camp grounds and a hospital evacuated.
- Significant wind damage along the east coast of Sicily.



Water level of Lake Maggiore at Locarno. The water level rose to a maximum value of 196.4 m above sea level on 13 and 16 November 2014. For these days it was a new record but it wasn't one for the entire November. All time record is 197.58 m (year 2000).

Source: BAFU

14-16 November 2014

- Flooding in southern France. 5 people died in their cars as they have been washed away.
- In Genoa boroughs were flooded, impassable roads and railways due to landslides.
- 2 people died in Lombardy, another 2 near Lugino in Ticino (CH), when their houses were battered by landslides.
- Power outages, highway 10 near Genoa closed, evacuation of a hospital in Omegna (IT).

This summary report was produced in conjunction with wettergefahren-fruehwarnung.de and with information from orf.at, tagesschau.de, ansa.it, france3-regions.francetvinfo.fr, [Le Parisien](http://LeParisien.com)

Agenzia Regionale per la Protezione Ambientale (ARPA), Agenzia Regionale per la Protezione Ambientale del Veneto (ARPAV), Protezione Civile della Regione Liguria, Servizio Informativo Agrometeorologico Siciliano

Bundesamt für Umwelt (BAFU). Switzerland

Deutscher Wetterdienst, MeteoSchweiz, klimadiagramme.de, infoclimat.fr, meteociel.fr