



STATISTICHE

UNDERSTANDING VENETO IN FIGURES AND DIAGRAMS

FLASH

This issue of Statistiche Flash deals with the bad weather that hit the Veneto region at the end of October 2018, in order to highlight its exceptional nature through the analysis of the data, the circumstances and the comparison with other previous events. The weather event at issue was characterised by persistent and intense rainfalls, which particularly affected the Alpine area; moreover, and especially in some mountain localities, there were unprecedented winds reaching, 'violent storm' and 'hurricane-force' speed according to the International Beaufort scale, with considerable damage to the woodland and structures of Veneto.

THE WEATHER EVENT OF 27-30 OCTOBER 2018 IN VENETO

The recorded data show that in some localities, cumulative rainfalls over a period of 4 days broke absolute records or reached values close to absolute maximum values. For example, the station of Soffranco in Longarone, measured 715,8 mm of cumulative rainfall, the highest

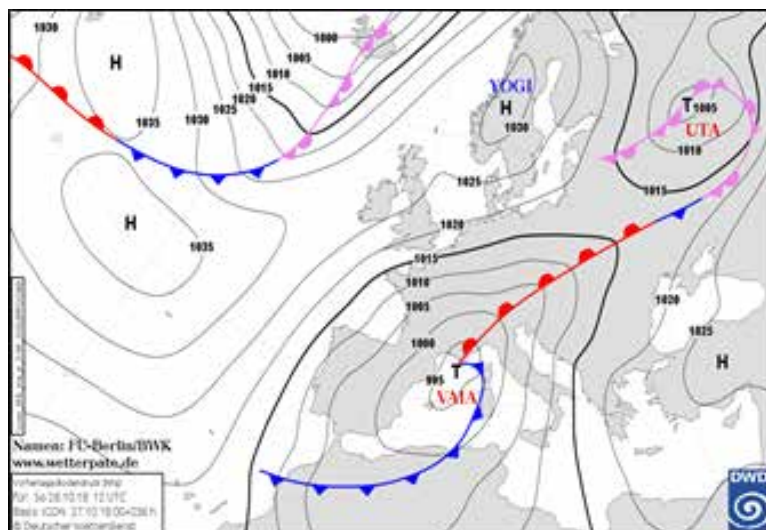
value ever recorded by ARPAV over the last thirty years. During the flood of 2010, the maximum cumulated rainfall between 31 October and 3 November was 587,2 mm, measured in the locality of Valpore (Seren del Grappa). As evidence of the exceptional nature of this event of 2018, Sappada and Agordo recorded the highest rainfall values measured in those locations, at least since 1950. Veneto was affected unevenly by weather phenomena: in central and southern plains, precipitations were more discontinuous and of lower entity.

The two maps below show, on the left, the weather situation over Europe as of 12 noon of 28 October, characterised by low pressure over the Mediterranean sea and by the warm front in the Alps, and on the right, the strong electrical activity recorded during the entire day of 29 October 2018 (in yellow-orange, the lightning occurred in the afternoon-evening).

THE ATMOSPHERIC CIRCULATION AND ELECTRICAL ACTIVITY OVER EUROPE

The low pressure over the Gulf of Lion and the warm front in the Alps on 28 October 2018

The electrical activity on 29 October 2018



Source: DWD Deutscher Wetterdienst and Blitzortung.org

WEB
Flash

ALSO AVAILABLE:

- The new website of the Statistics Office is now available
- Resident population by sex, age and marital status - Year 2017
- International trade - Final data for 2017 and provisional data for the 3rd quarter of 2018

<http://www.regione.veneto.it/web/statistica>



THE TREND OF THE RAINFALL

The first part of October 2018, prior to the event, was characterised by fairly modest rainfall compared with the monthly averages from 1981 to 2010; in particular in the 19 days preceding the event, on a large part of the province of Belluno and the central Prealps, rainfall inputs were equal to zero or less than 1 mm. The particular intensity of the event of 27-30 October 2018 can be easily understood from the map of cumulated rainfall, which shows how the previous situation of rare rainfall reversed in 4 days, at least as regards the Alps and Prealpine areas. In the province of Belluno, cumulative rainfall exceeded the 30-year averages referred to the entire month, for the same areas: compared to monthly historical averages of approximately

150 mm in the central part of the Belluno area (Agordino and Longarone), the amount of rainfall recorded during the 4 days were comprised between 300 and 700 mm.

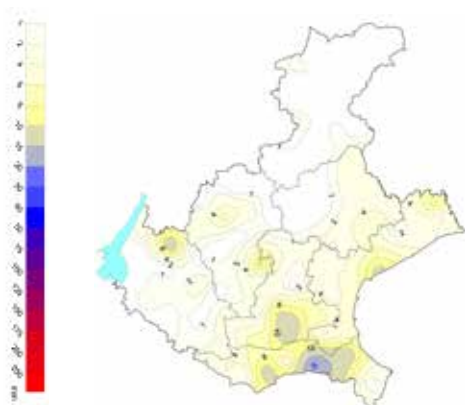
In the plains, the measured rainfall are much less relevant, comprised between 70-100 mm in the northern part and 20-40mm in the southern coast.

The comparison between the event of 2018 and the flood of 1966, carried out by analysing differences between rainfalls in the region during the three central days of the two events, highlights how in 2018 they concentrated more on the central and northern Dolomites as well as on the western Prealps, with the maximum differences in the Belluno area, where they reached 150-200 mm. On the contrary, in 1966, the major rainfall was registered on a part of central and eastern Prealps and on the eastern plains, with cumulative differences of 100 mm.

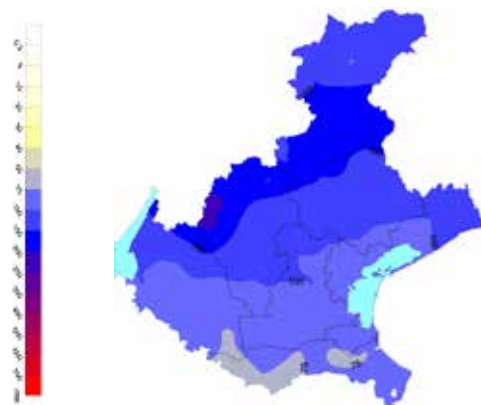
In addition, the rainfalls of the flood of 1966 were more concentrated in time, without interruptions, and their effect on outflows was increased from the abundant precipitations of the previous period and by the presence of snow on the ground that melt also at higher altitudes as a consequence of the sudden increase in temperatures.

RAINFALL CONCENTRATED IN THE LAST 4 DAYS OF OCTOBER

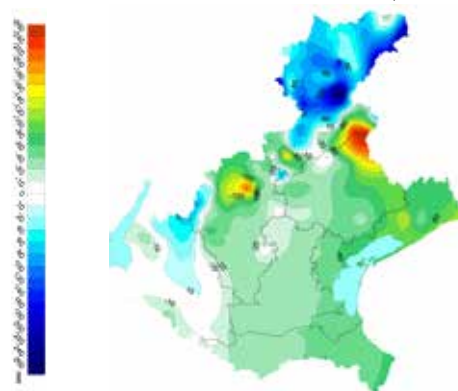
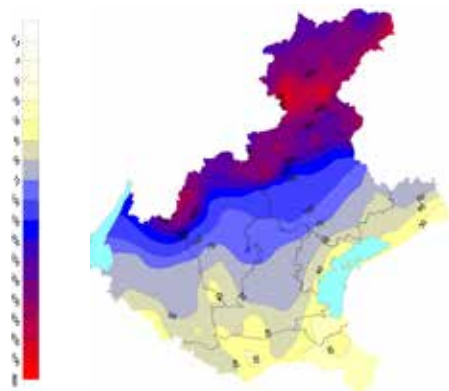
Rainfall inputs in the 19 days preceding the event (mm) Average rainfalls during the month of October (mm) – Years 1981:2010



Rainfalls of the event 27-30 October 2018 (mm)



Difference between the rainfalls of the events of 2018 and 1966 (mm fallen during the 3 central days, 27-28-29 October 2018 and 4-5-6 November 1966)



(*) In blue, the areas where the precipitations of October 2018 were more numerous, while shades from green to red identify the areas of major precipitation in 1966

Source: ARPAV – Centro Meteorologico di Teolo

The strong wind that affected the mountain area and the Veneto coast is an important aspect of this event. The southern streams (Sirocco wind) are typically associated with disturbances affecting Veneto in autumn but, in this case, the mountain territory was affected by extreme winds that reached, in the afternoon and evening of Monday 29, values never measured since 1992, year of the beginning of the activity of the ARPAV stations. The 16 stations that registered the most violent gusts, over 100 km/h, are in fact all located in mountain areas. In 13 of these stations, the strongest gust registered on 29 October also coincides with the absolute maximum value.

THE WIND

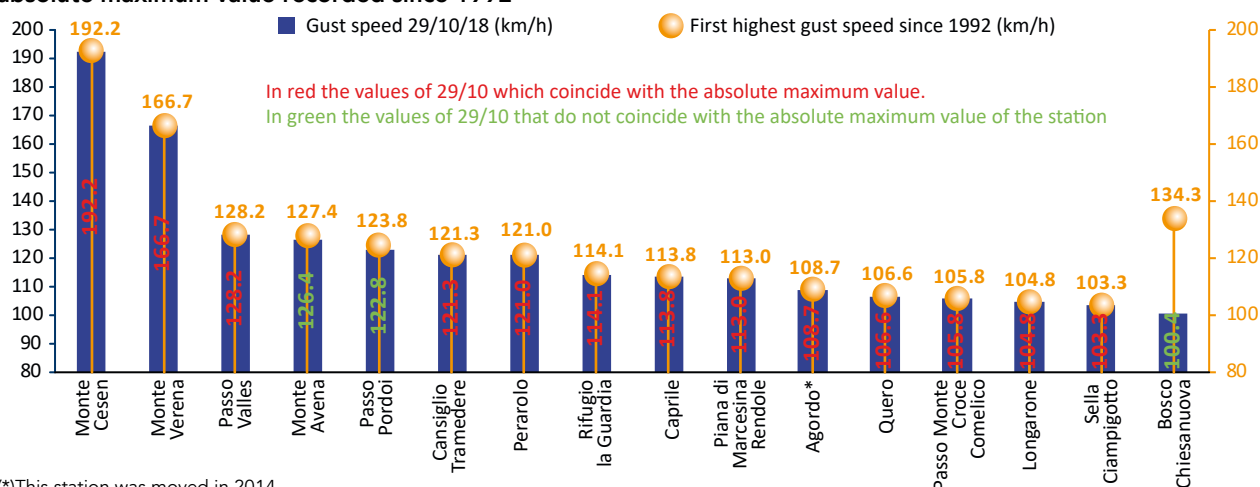
Most of these 16 stations are located on peaks or passes between the Verona Prealps and the occidental ones, up to the passes and peaks of the Dolomites, but some of them are also located at the bottom of the valley of the Belluno area, such as Perarolo, Caprile, Agordo, Quero and Longarone.

The hourly analysis of the winds at the ARPAV station of Mount Cesen, located at the peak of Eastern Pre-Alps, at an altitude of 1,552 m, is very representative, since it registered the absolute record of the most violent wind gust of about 192 km/h.

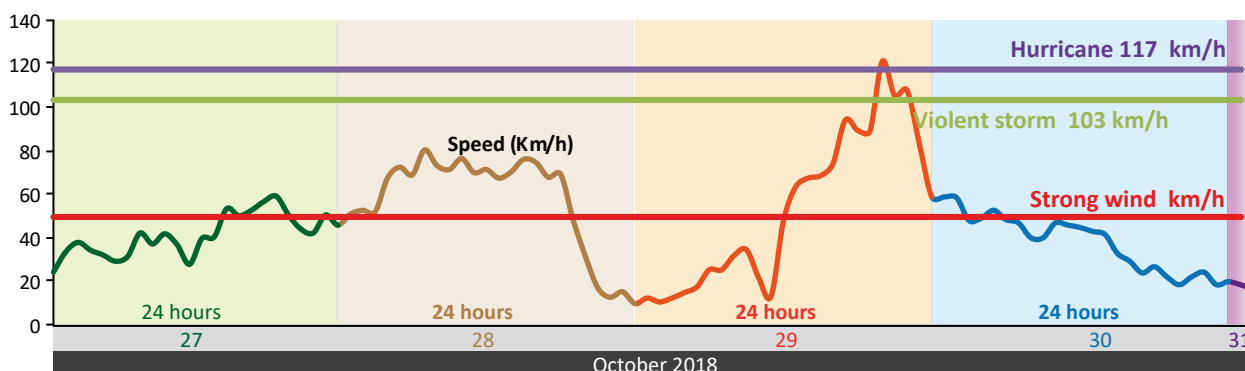
We should note that most of the day of 29 October was characterised by strong wind, over 50 km/h, with a particularly intense phase that began at 4 pm, with hourly averages over 88 km/h, culminating between 7 pm and 9 pm, when the registered hourly averages were comprised between 104 and over 120 km/h; according to the international Beaufort scale, these winds are in between categories of 'violent storm' (103-117 km/h) and 'hurricane force' (>117 km/h).

IN MANY LOCALITIES WIND GUSTS BROKE SPEED RECORDS

The strongest wind gusts (speed expressed in km/h) recorded in the Veneto stations - Value 29 October 2018 and absolute maximum value recorded since 1992



Trend of average hourly speeds of wind at the station of Mount Cesen – October 29, 2018



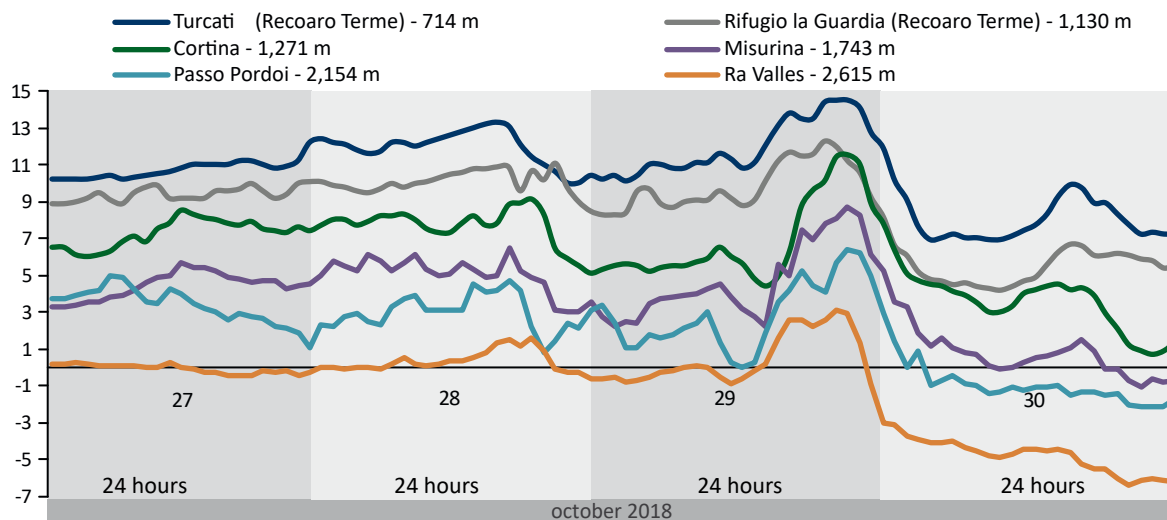
Even if the relationship between the temperature and snowfall is anything but univocal, the trend of the temperatures for the autumn rainfall is however important to understand if it will be rain or snow. As shown by the graph of average hourly temperatures of the four days of interest in the six stations considered, during the early stages of the event, from 27 October to early afternoon of 28 October, snow only fell at altitudes over 2,200-2,500 m, as well as in the morning and in the first hours of the afternoon of 29 October, when the second phase of intense rainfall occurred because of the strong Sirocco winds, exceeding in some cases 0°C even at 2,600 m (Ra Valles). Finally, only on 30 October, the temperatures dropped causing snowfalls even at altitudes lower than 2,000 m, when the weather event was towards the end.

THE TREND OF THE TEMPERATURES

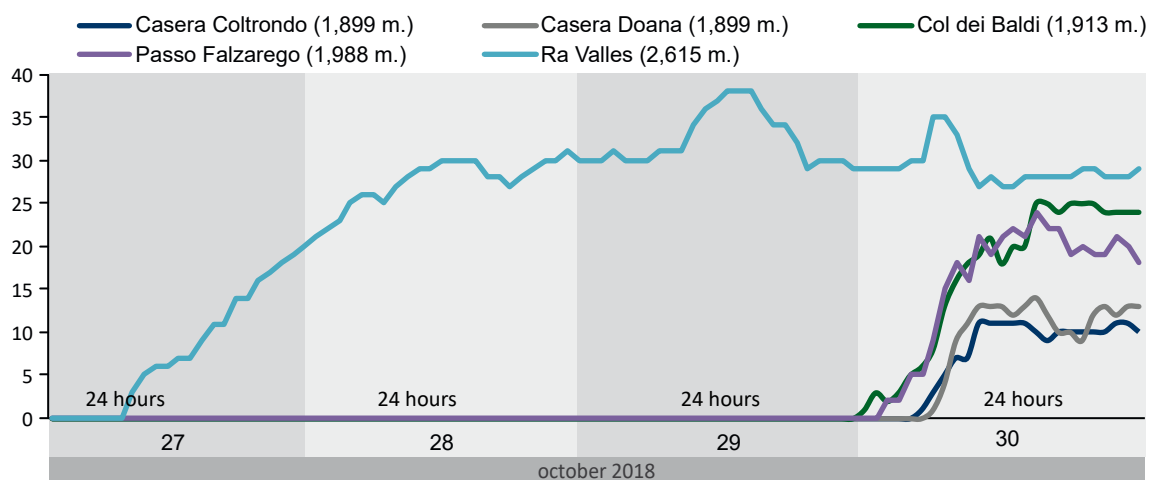
The almost total absence of snowfall in the most acute stage of the weather condition did not allow the temporary immobilisation of water in the hydrological processes, allowing faster outflows, which have worsened the flooding rivers.

TEMPERATURES STOOD OVER THE SEASONAL AVERAGES

Average hourly temperatures in 5 localities at elevation (between 714 and 2,615 m.) from 27 to 30 October.



Height of snow on the ground hour by hour from October 27 to October 30 in the Dolomites area (cm)



Source: Processing of data from ARPAV by the Statistics Office of Regione Veneto