# METEOCLIMATIC REPORT AND ACTIVITIES ANNEXED TO THE RURITAGE PROJECT 

AUGUST 2020

Before analysing the climatological weather events of August of the year 2020, I would like to highlight that in this document, for the first time, some data deriving from the municipal meteorological network specifically created with RURITAGE funds will be introduced, which will allow us to highlight the different microclimatic situations that characterize the territory of Appignano del Tronto, obviously also for agro-meteorological and operational purposes within the local Civil Protection.

The meteorological stations have the following geographical features, compared with those of the Brecciarolo meteorological station, the subject of the main analysis up to now:

| STATION | Lat WGS84 | Long WGS84 | elev m. |
| :--- | :--- | :--- | ---: |
| Colle Guardia | $42^{\circ} 53^{\prime} 55.2^{\prime \prime}$ | $13^{\circ} 38^{\prime} 17.4^{\prime \prime}$ | 398 |
| Campetello | $42^{\circ} 53^{\prime} 18.4^{\prime \prime}$ | $13^{\circ} 41^{\prime} 30.3^{\prime \prime}$ | 180 |
| Salaria | $42^{\circ} 51^{\prime} 27.4^{\prime \prime}$ | $13^{\circ} 41^{\prime} 38.1^{\prime \prime}$ | 81 |
| Brecciarolo | $42^{\circ} 51^{\prime} 07.2^{\prime \prime}$ | $13^{\circ} 39^{\prime} 05.3^{\prime \prime}$ | 78 |

Table 1 - geographic features of meteo climatic stations
As can be seen, the stations of Brecciarolo and Salaria are almost coincident and boast a similar morphological position, at the bottom of the valley, while the station of Campetello is located on a slope facing SW and Colleguardia is the summit station. The Appignano HUB station located in the city center at an elevationof 194 m is already being activated.

Also the third month of the METEOROLOGICAL SUMMER 2020 was characterized by a prevalence of stable and sunny weather, determined by the rhythmic presence of the Atlantic subtropical anticyclone and the North African continental one. Only rarely, infiltrations of moist north-atlantic air masses and linked to deep undulations of the polar vortex have reached the area, causing short phases of atmospheric instability. Nevertheless, the monthly
thermal climate was not very hot, perfectly in line with the averages of the last thirty years and less hot in the last fifteen years

The rainfall, concentrated in just three days, turned out to be perfectly in line with climatic averages.

No particularly hot phases were observed even if the number of days with Tmax> $30^{\circ} \mathrm{C}$ were 25 while the six tropical nights all fell in the first half of the month.

More specifically, the two hottest days were the first two of the month, with baric conditions dominated by the African anticyclone at high altitude and by the Atlantic anticyclone on the ground, continuing the phase that began in the middle of the third decade of July. (figs. 1 and 2)


Figure 2 - pressure at the ground and geopotential at 500 hPa referred to 12 Z on August1th

This "mixed" baric configuration did not allow the thermal values to reach particularly high values, nor did the freezing level reach exceptionally high altitudes - even higher than 5000 meters - as has not rarely happened in recent years.


Figure 2 - - temperatures at geopotential 850 hPa relative to 12 Z on August1th
The anticyclonic forcing, at least in the first two decades of the month, was temporarily interrupted by an advection at the 500 hPa of cold air of polar maritime origin; the associated cold front produced, on day 5 , scattered and unintentional showers (accumulated everywhere below 10 mm ) but above all a sudden and brief thermal drop - of over $10^{\circ} \mathrm{C} / 24 \mathrm{~h}$.

The destabilization of the atmosphere that occurred on day 24 was much more intense fig. 3)

An albeit mild undulation of the Atlantic flow at high altitude associated with the arrival of cooler air from the north to the ground resulted in thunderstorm precipitation in the afternoon, including hail, with hourly accumulations that fluctuated between about 12 and 35 mm .


From the analysis of the complete thermometric data (table 2), it can be seen that the average monthly temperature was about $25.3^{\circ} \mathrm{C}-1.5^{\circ} \mathrm{C}$ higher than in July - the minimum temperature of $19.1^{\circ} \mathrm{C}$ maximum of $31.5^{\circ} \mathrm{C}$; consequently the monthly temperature range was around $12.4^{\circ} \mathrm{C}$. The hot days were 25 very hot ones alone while six were the tropical nights.

From the comparison with the average values for the period 1981-2018 for the Ascoli Piceno station, it is possible to notice an almost perfect identity of the values, higher by about $0.3^{\circ} \mathrm{C}$, with minimums higher by about half a degree and the maximums of all coincident.

If, on the other hand, we compare the data with those concerning the last fifteen years for the same Brecciarolo station, as happened for the month of June, a lower than average value emerges of about $0.7^{\circ} \mathrm{C}-25.3^{\circ} \mathrm{C}$ Vs $26^{\circ} \mathrm{C}$.

With regard to precipitation, the signal was characterized by an almost perfect identity in the monthly cumulative - 46 mm Vs 48 mm of climatic average - with precipitation distributed in just 3 days compared to an average of 3.7 days. There were two stormy days; on the 24 th between 16 and 18 LT about $80 \%$ of the monthly rainfall.

## M THE COMPARISON OF THE TEMPERATURES AND PRECIPITATIONS BETWEEN THE BRECCIAROLO STATION AND THE THREE NEW STATIONS MENTIONED AT THE BEGINNING

OF THE REPORT and reported in Table 1, we can make brief but interesting considerations:

| STATION | Lat WGS84 | Long WGS84 | elev m. | Tmax | Tmin | Tav | Prec. Mm | RH\% |
| :--- | :--- | :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Colle Guardia | $42^{\circ} 53^{\prime} 55.2^{\prime \prime}$ | $13^{\circ} 38^{\prime} 17.4^{\prime \prime}$ | 398 | 27,3 | 18,4 | 22,9 | 34,4 | 65,7 |
| Campetello | $42^{\circ} 53^{\prime} 18.4^{\prime \prime}$ | $13^{\circ} 41^{\prime} 30.3^{\prime \prime}$ | 180 | 30,6 | 20,9 | 25,8 | 43,3 | 58,1 |
| Salaria | $42^{\circ} 51^{\prime} 27.4^{\prime \prime}$ | $13^{\circ} 41^{\prime} 38.1^{\prime \prime}$ | 81 | 32,3 | 19,6 | 26,0 | 39,0 | 59,6 |
| Brecciarolo | $42^{\circ} 51^{\prime} 07.2^{\prime \prime}$ | $13^{\circ} 39^{\prime} 05.3^{\prime \prime}$ | 78 | 31,5 | 19,1 | 25,3 | 45,6 |  |

Table 1 - average monthly climatic features for the stations of the Ruritage project
First of all, the significant difference between the average monthly temperatures of the Colle Guardia summit station and the others is evident - averagely quantifiable in about $3^{\circ} \mathrm{C}$ compared to a difference in altitude of about 300 m . Consequently, the average thermal gradient is very high - about $1^{\circ} \mathrm{C}$ every 100 meters of altitude. Obviously, then, this temperature difference is almost entirely the prerogative of the maximum values while the minimum values differ less between the different stations, with evidently very high values in the slope station of Campetello (as many as 20 tropical nights out of 28 days of totally available data).

As for precipitation, a rather homogeneous but difficult to interpret co-operation is observed, with cumulative values but lower than the highest altitudes.

Finally, with regard to the average relative humidity rates, a poor decrease is evident in relation at the fall of altitude.

Table 2 and figure 4 show daily climatic data for the Brecciarolo station, with the respective monthly averages and the relative thermo-pluviometric graph

| Y | M | D | Tmin | Av ${ }^{\text {T }}$ | Tmax | Prec. mm | RD | TS | HotD | Trnig |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2020 | 8 | 1 | 22,9 | 29,0 | 35,1 | 0 |  |  | * | * |
| 2020 | 8 | 2 | 21,5 | 27,3 | 33,1 | 0 |  |  | * | * |
| 2020 | 8 | 3 | 18,4 | 25,8 | 33,1 | 0 |  |  | * |  |
| 2020 | 8 | 4 | 18,5 | 24,0 | 29,5 | 0 |  |  |  |  |
| 2020 | 8 | 5 | 17,3 | 19,4 | 21,5 | 8 * |  |  |  |  |
| 2020 | 8 | 6 | 19,8 | 23,7 | 27,5 | 0 |  |  |  |  |
| 2020 | 8 | 7 | 20,1 | 25,1 | 30 | 0 |  |  |  | * |
| 2020 | 8 | 8 | 20,1 | 25,2 | 30,3 | 0 |  |  | * | * |
| 2020 | 8 | 9 | 19,2 | 26,2 | 33,1 | 0 |  |  | * |  |
| 2020 | 8 | 10 | 20 | 26,8 | 33,5 | 0 |  |  | * |  |
| 2020 | 8 | 11 | 19,9 | 26,8 | 33,6 | 0 |  |  | * |  |
| 2020 | 8 | 12 | 20,6 | 26,7 | 32,7 | 0 |  |  | * | * |
| 2020 | 8 | 13 | 19,4 | 26,9 | 34,4 | 0 |  |  | * |  |
| 2020 | 8 | 14 | 19,6 | 26,3 | 32,9 | 0 |  |  | * |  |
| 2020 | 8 | 15 | 19,6 | 26,0 | 32,4 | 0 |  |  | * |  |
| 2020 | 8 | 16 | 18,9 | 25,3 | 31,7 | 0 |  |  | * |  |
| 2020 | 8 | 17 | 20,1 | 26,6 | 33 | 0 |  |  | * | * |
| 2020 | 8 | 18 | 19,2 | 25,3 | 31,4 | 0 |  |  | * |  |
| 2020 | 8 | 19 | 17,8 | 23,7 | 29,6 | 0 |  |  |  |  |
| 2020 | 8 | 20 | 18,5 | 25,3 | 32 | 0 |  |  | * |  |
| 2020 | 8 | 21 | 18,4 | 25,9 | 33,4 | 0 |  |  | * |  |
| 2020 | 8 | 22 | 19,6 | 27,5 | 35,4 | 0 |  |  | * |  |
| 2020 | 8 | 23 | 20 | 27,0 | 34 | 0 |  |  | * |  |
| 2020 | 8 | 24 | 17,9 | 23,8 | 29,6 | 31,4* |  | * |  |  |
| 2020 | 8 | 25 | 17,1 | 23,2 | 29,3 | 0 |  |  |  |  |
| 2020 | 8 | 26 | 19,4 | 25,7 | 31,9 | 0 |  |  | * |  |
| 2020 | 8 | 27 | 17,2 | 24,5 | 31,8 | 0 |  |  | * |  |
| 2020 | 8 | 28 | 19,5 | 25,5 | 31,4 | 0 |  |  | * |  |
| 2020 | 8 | 29 | 18,2 | 25,9 | 33,6 | 0 |  |  | * |  |
| 2020 | 8 | 30 | 18,7 | 25,6 | 32,4 | 0 |  |  | * |  |
| 2020 | 8 | 31 | 14,3 | 18,5 | 22,7 | 6,2 * |  | * | * |  |
| average |  |  | 19,1 | 25,3 | 31,5 | 45,6 | 3 | 2 | 25 | 6 |
| av.81-18 |  |  | 18,5 | 25,0 | 31,5 | 48 |  |  |  |  |
| av 03-19 |  |  |  | 26 |  |  |  |  |  |  |

Table 2 - Daily summary of weather data available for December 2018. LEGEND: AvTmin: minimum temperature; AvTmed: average temperature: AvTmax: maximum temperature; prec mm: daily precipitation; $\mathrm{RD}=$ rainy days $>1 \mathrm{~mm}$; TS: Thunderstorms; Hd: hot days (with Tmax $\geq 30^{\circ} \mathrm{C}$ ). Trnig: ,tropical night; (with Tmin $>20^{\circ} \mathrm{C}$ )


Figura 4 - grafico dei dati termo-pluviometrici giornalieri

