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GENERAL CLIMATIC STUDY OF APUSENI MOUNTAINS (GHETARI – POIANA CALINEASA AREA)

Theme

– 34 climatic parameters concerning air temperature and moisture, cloudiness and sunshine duration, precipitation, snow layer, wind and the meteorological phenomena.

Methodology

- processing and analyzing data resulted from observations carried out at five meteorological stations: Campeni – h 591 m.a.s.l., Stana de Vale – h 1108 m.a.s.l., Baisoara – h 1361 m.a.s.l., Vladeasa 1400 – h 1404 m.a.s.l. and Vladeasa – h 1836 m.a.s.l;

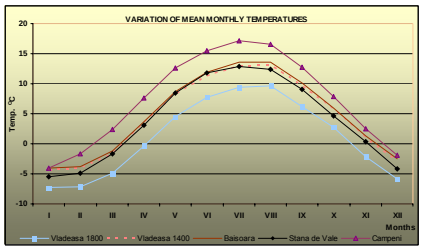
- the analyzed period was 1961-2000; data concerning the extreme values resulted from the whole operating period of the meteorological stations.

The study only comprises the general characterization of the Apuseni Mountains climate, yet assessments were also made, as much as possibilities allowed, concerning the values of the meteorological parameters in the Ghetari – Poiana Calineasa area.

CLIMATIC CHARACTERIZATION

Air temperature

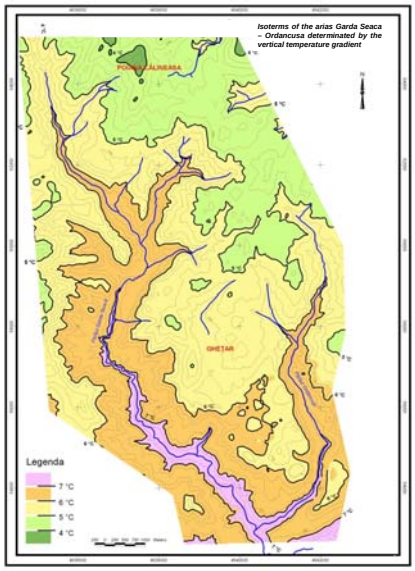
- differentiation between the western and eastern slopes, as a result of the prevailingly westerly circulation, air descending and its adiabatic warming take place on the eastern slopes;



- mean annual temperatures higher by 0.5-0.9ºC on the eastern slopes;
- differences are larger in winter (1.2-1.4ºC) than in summer (0.2-0.7ºC);
- differences between the values from the four decades with measurements:

Annually 0.5 - 0.7ºC warm 1991-2000 cold 1971-1980
January 2.0 - 3.0ºC warm 1991-2000 cold 1961-1970
July 1.5 - 1.7ºC warm 1991-2000 cold 1971-1980

- throughout the year the monthly means have minimum values in January and maximum in July; at over 1400-1500 m.a.s.l. values in January and February are approximately equal and those in August are higher than those in July ;
- the following values of the mean air temperature are estimated for the Ghetari – Poiana Calineasa area: 4ºC annually, -5ºC in January and 13ºC in July.



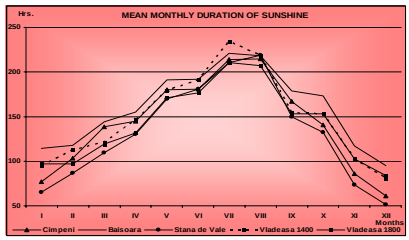
- the annual number of freezing days (with minimum temperature ≤ 0ºC) rises from 135 days in the Aries river valley to about 150 days at 1400 m.a.s.l. and nears 200 days at 1800 m.a.s.l.;
- in 20% of the annual number of freezing days, the minimum temperature even dropped below -10ºC (on 25-30 days in the Aries river valley, up to 1400 m.a.s.l.);

Relative air moisture

- differentiation maintains between the western and eastern slopes, as a result of the prevalence of the westerly air circulation;
- values smaller by 8-13% on the eastern slopes;
- differences are larger in January (12-16%) and smaller in July (6-11%);
- over the year, maximum values in December as a result of the displacement of the relatively warm and moist air from the Mediterranean Sea; minimum values in April in the low areas and in October at altitudes over 1200-1300 m.a.s.l.;
- a relative moisture of 80-81% is estimated as the annual mean for the Ghetar – Poiana Calineasa area.

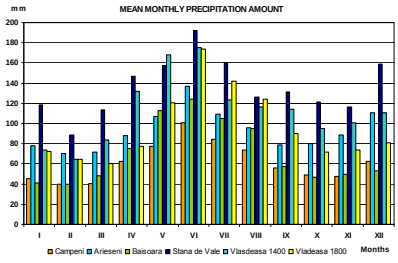
Cloudiness and sunshine duration

- on the eastern slopes the higher cloudiness causes the annual sunshine duration to be by 200-300 hours smaller than on the eastern slopes;
- a very wide fluctuation with time of the annual number of sunshine hours: about 430 hrs. at Vladeasa 1400 (a station with a short operating period), about 500 hrs. at Campeni, about 600 hrs. at Baisoara and about 700 hrs. at Vladeasa.



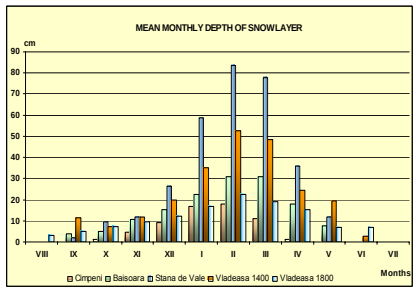
Precipitation

- data were also used from the Arieseni measurement point, situated at an altitude of 900 m.a.s.l. in the commune with the same name;
- very large precipitation amounts fall on the western slopes (over 1600 mm annually at Stana de Vale), the largest in the whole Romania; on the eastern slopes the annual amounts diminish almost by half (below 850 mm at Baisoara);
- during the year, the monthly maximum is in June, caused by the cyclonic activity and the thermal convection in the unstable air masses (over 100 mm at all the meteorological stations); the monthly minimum is in February – March, when a high pressure prevails, induced by the Euro-Asian Anticyclone ridges.
- the annual number of days with precipitation is 180-190 in the mountain area (with a maximum of over 200 days on the highest peaks) and 150-160 along the Aries River valley;



Snow layer

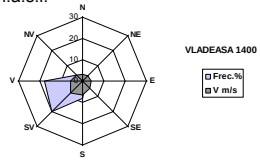
- the mean date of the first day with snow layer situates in October, while that of the last day with snow layer – in May. Between these dates, the mean duration of the interval when the snow layer is possible is of about 185 days at altitudes of 1100-1400 m.a.s.l. and of over 200 days at altitudes higher than 1400 m.a.s.l.;



- the number of days with snow cover is about 150-155 days, being smaller on the eastern slope (about 130 days) and along the Aries River valley (about 60 days);
- the mean monthly snow depth oscillates within 1-3 cm at the beginning and end of the period with snow layer, reaching 16-18 cm in January and February along the Aries River Valley, up to 84 cm at Stana de Vale. At higher altitudes, in obstacle-free areas, due to the wind action the mean monthly depth does not exceed 20-30 cm

Wind

- observations are performed at a height of 10 m with the wind vane, data representing values mediated over a two minute-interval;
- on the highest peaks of the Apuseni Mountains the mean annual frequency of the westerly wind exceeds 60%; as the altitude decreases and a higher sheltering degree settles, its share decreases to around 40% at Vladeasa 1400 and Baisoara, to 23% at Campeni and 13% at Stana de Vale. The share of calm wind increases (Vladeasa 11%, Vladeasa 1400 and Baisoara 35-40%, Campeni 67%, Stana de Vale 75%);
- the highest mean annual speeds are reached by the winds holding the highest frequency (the westerly ones): from 2-3 m/s in the depression areas to 6-7 m/s at over 1400 m.a.s.l. and even 8-10 m/s at 1800 m.a.s.l.



As a conclusion, it can be assessed that an important role is played in the territorial distribution of the values of the climatic parameters in the Apuseni Mountains by the disposition of the slopes against the prevailingly westerly displacing direction of the air masses, together with the vertical zoning.

On the slopes with a westward disposition the adiabatic cooling of the ascending air enhances the cloud formation and precipitation falling processes. On the eastern slopes, as an effect of the air descending and of its adiabatic warming, the relative moisture decreases, clouds dissipate and precipitation diminish notably.

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