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The atmosphere circulation movements in the matching with space weather parameters variations

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The work presents some investigation results of the Space Weather state during the macrosynoptic processes movements in North Atlantic and Eurasia extratropical latitudes. The types of these processes, as it is known, were defined by A. F. Vangengeim as atmosphere circulation types: E-type (east transport in the troposphere which matches with stable anticyclone above the continent), W-type (west transport), and C-type (meridional transport).

The investigation time interval: 1.01.2007 – 1.01.2014. That corresponds to: the Solar Activity (SA) 23 cycle fall branch, the SA minimum, the rise branch of the 24 SA cycle, the maximum of 24 SA cycle.

From the investigation we have found out the different periods of the circulation types conservation: (5-7) days which corresponds to the Natural Synoptic Period (NSP) in Europe region – in our study we have registered 95 NSP cases - it occurs 45% of all discovered periods); (7-10) days – 27% (58 cases), and the Long Period (LP) which endured more than 10 days - 28% (59 cases).

Here we compare the space weather state at the beginnings of NSP and LP.

We have investigated the matching of LP-circulation with registered Long-live Pressure Systems (LPS) on different terrestrial latitude locations - Saint-Petersburg (59°57'N, 30°19'E) and Tambov (52°43'N, 41°27'E).

Space Weather parameters were: global variations of SA parameters; daily characteristics of the SA flare component in various bands of the electromagnetic spectrum; variations of Interplanetary Space characteristics in Earth vicinity; variations of daily statistics of Geomagnetic Field characteristics.

Results: (1) The modes of LP-circulation distributions are in the SA maximum and on the SA rise branch (37% and 36% of all LP cases respectively). (2) LP- E-type occurs 56% of all LP. (3) NSP- W-type occurs 48% of all NSP. (4) Most frequent LP- E- type placed on the SA rise branch (24% of all LP). (5) The opening and final moments of LP-circulations was not the same for those moments of LPS on different terrestrial latitude locations but 50% of Saint-Petersburg LPS and 81% of Tambov LPS were intersecting with the time intervals of LP-circulations. (6) All Saint-Petersburg anticyclonic

LPS and 82% of them in Tambov area have registered with the E-type of atmosphere circulation. (7) The behaviour of the whole Space Weather parameters complex is specific for LP and differs from it for NSP of different circulation types. (8) The days of the maximal difference of abovementioned complexes were discovered in the folder epoch's interval – that shows the good forecast perspective. (9) The concrete Space Weather parameters which difference the moments of LP-beginnings from NSP-beginnings are listed in the work.

Results may be useful for the understanding of the solar-terrestrial connections and can create the base for the forecast of atmosphere response to the space impact.