The tendency of hazardous geological processes development on the territory of Russia at the beginning of the XXI century

Boris KRESTIN*, Irina MALNEVA*, Nina KONONOVA** (Russian Federation)
* All-Russian Research Institute for Hydrogeology & Engineering Geology (VSEGINGEO), krebor@rambler.ru; irmaln@rambler.ru
**Institute of Geography Russian Academy of Science, NinaKononova@yandex.ru

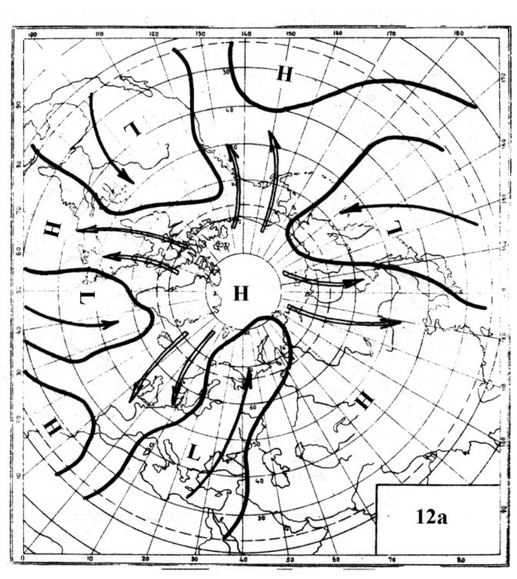
During the period of modern climatic anomalies regional assessment of the trends of hazardous exogenic processes development becomes of utmost importance, in particular that of landslides and mudflows, which manifestations can have disastrous consequences.

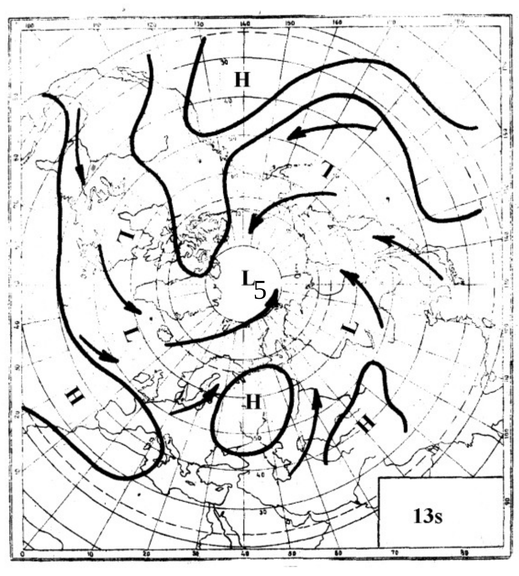
To assess the hazard of developing hazardous exogenic processes in a specific region information about the activity of their manifestations, meteorological data (air temperature, rainfall) and the Calendar of consecutive change of elementary circulation mechanisms (ECM) in the atmosphere of the Northern hemisphere on the BL Dzerdzeevskii classification are used. ECMs that determine the weather conducing activation of landslides and mudflows in a particular region are identified.

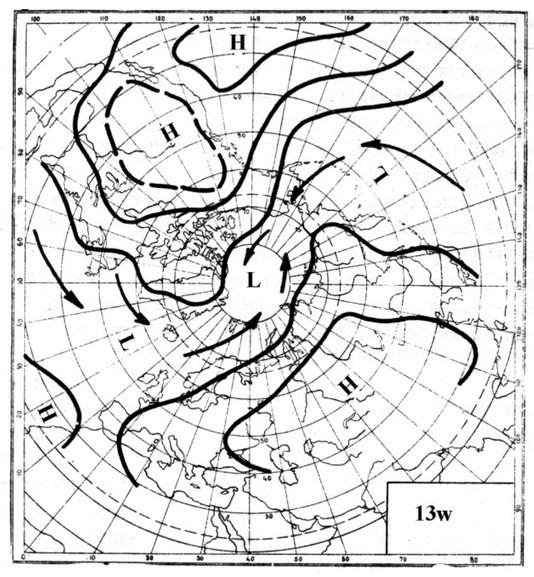
It is established that the strong activation occurs under the combined effect of natural and anthropogenic factors (Northern Caucasus in June 2002 and in July 2012, the Big Sochi area in 2013). The periods of strongest activity of landslides and mudflows are determined by the periods of meridional circulation, equally North or South.

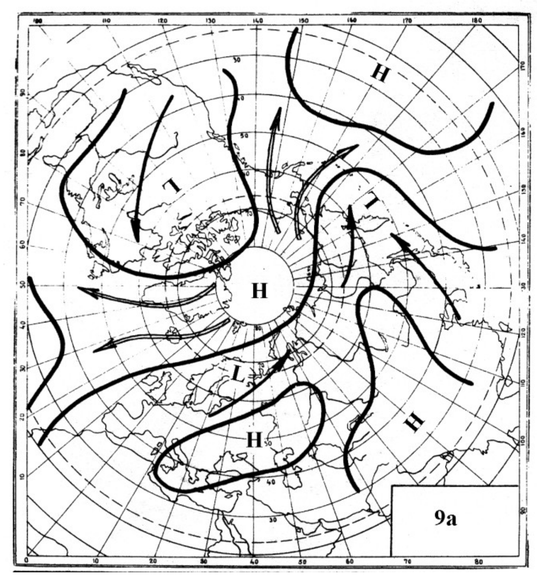
In general, it should be noted that taking into consideration the contrast of the modern climate and the increasing anthropogenic impact, in the coming years the territory of the Russian Federation will most likely see a significant increase in the danger of catastrophic manifestations of hazardous exogenic processes, especially landslides and mudflows.

Elementary circulation mechanisms (ECM), where abundant rainfall simultaneously in different regions of Russia are revealed.

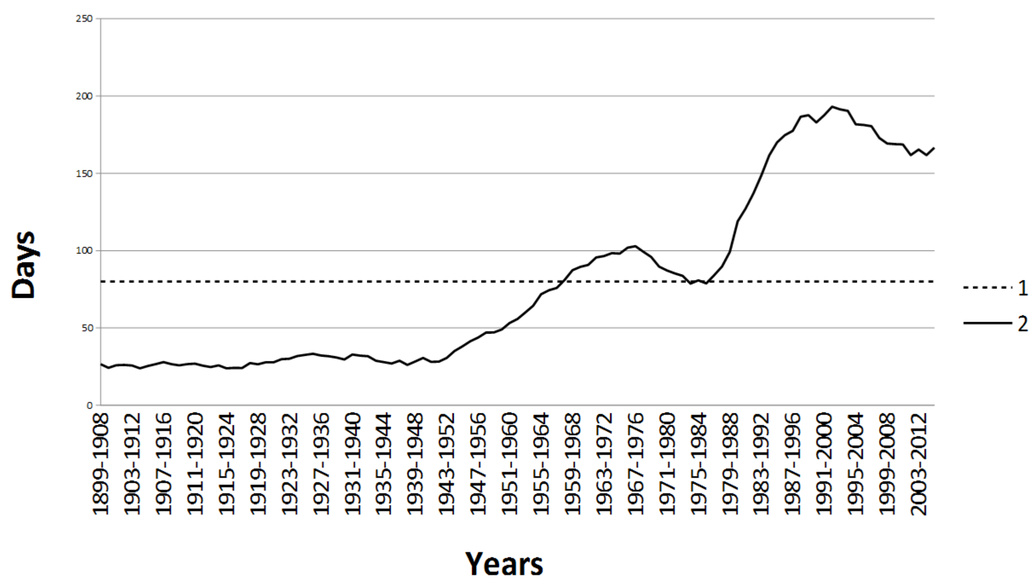








The total annual duration ECM identified for 1998-2014 years .: ECM 12a 54 days, ECM 13s 48 days, ECM 13w 45 days, ECM 9a 23 days. In sum, 170 days per year. It is the longest duration for the entire observation period from 1899



The total annual duration of ECM, bringing heavy rainfall at the same time in different regions of Russia: 1 - the average for 1899-2014 gg .; 2 -10-year moving average for 1899-1908 - 2005-2014.

Precipitation formed at the front of the southern cyclone. Precipitation increase if the cyclone path is blocked by a stationary anticyclone. Heavy rains provoke activation of mudflows and landslides. In the XXI century the recurrence of natural disasters. associated with precipitation has increased in the Crimea (Oliferov. 2014), in the Northern Caucasus (Kononova, 2012 Kononova, Malneva,2007, 2012, 2013), Altai (Malygina et al., 2014), in the Baikal Region and the Far East (Kononova, 2914, 2014a, 2014b; Malneva et al., 2014).

Conclusion

The atmospheric circulation in the XXI century is very unstable. The proximity of dissimilar air masses contribute to the exacerbation of the fronts exacerbate and increase the frequency of showers. As a result, increases the frequency of exogenic processes associated with heavy rains.