



## **Comparative Analysis of Thunderstorm Activity in the West Caucasus According to the Instrumental Measurements and Weather Stations Observations**

Zalina Knyazeva (1), Zainaf Gergokova (1), Ruslan Gyatov (1), and Anton Boldyreff (2)

(1) High Mountain Geophysical Institute, department of natural disasters, Nalchik, Russian Federation (zknyaz-kbsu@mail.ru), (2) Southern Federal University, Taganrog, Russian Federation

The number of thunderstorms days is one of the main characteristics of thunderstorms. In most cases, the number of days with different meteorological phenomena are the climate characteristic of the area. This characteristic is a common climate indicator.

The comparative analysis of thunderstorms days quantity, received with lightning detector LS 8000 by Vaisala and weather stations of Krasnodar District (Russia), is presented. For this purpose the Krasnodar region was divided into 19 sites. The thunderstorm days amount and their comparison were conducted for each site according to the data of weather stations and LS 8000 lightning detectors.

Totally 29 weather stations are located in this area. The number of thunderstorm days per year for the period of 2009-2012 was determined according to data, received from stations.

It was received that average annual number of thunderstorm days for this area was from 33 to 39 days. The majority of thunderstorm days per year (up to 77) was registered in the south of Krasnodar region and on the Black Sea coast. The lowest thunderstorm activity (about 20 days) was observed in the North of the region.

To compare visual and voice data for calculating thunderstorm days quantity of the Krasnodar region, the day was considered thundery if at least one weather station registered a storm.

These instrumental observations of thunderstorms allow to obtain the basic characteristics and features of the distribution of thunderstorm activity over a large territory for a relatively short period of time. However, some characteristics such as thunderstorms intensity, damages from lightning flashes and others could be obtained only with instrumental observations.

The territory of gathering thunderstorm discharges data by system LS8000 is limited by perimeter of 2250 km and square of 400 000 km<sup>2</sup>.

According to the instrumental observations, the majority of storm activity also takes place on the Black Sea coast, near the cities of Sochi and Tuapse. Thus the number of thunderstorm days data characterized by the values from 49 to 158.

To compare instrumental and visual-voice observations the difference between thunderstorms days quantity, obtained with visual-voice and instrumental methods, was selected as an indicator of thunderstorm activity.

Total number of thunderstorm days in the Krasnodar region during 4 years is 565 according to the lightning detectors and 519 according to the weather stations.

The presence of significant differences was revealed to compare number of thunderstorm days between instrumental observations and weather stations data. Thus the value of the average number of thunderstorms days on 29 meteorological stations of the Krasnodar region is reached 33-39 days. At the same time, 49-138 thunderstorm days were recorded according to the LS8000 system. This difference is caused by two factors:

- 1) limitations of visual-audio thunderstorms detection method at weather stations;
- 2) development of thunderstorms in a limited areas of the Krasnodar region, which is not the whole territory.