

Dependence of meteorological parameters on geomagnetic storms in Georgia

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Abstract— The renewable solar, wind and bio energies became more and more actual and applicable in the World. Many studies have been devoted to study their application ways and develop equipments and devices to produce energy supply. The research of their possible energy potential is crucial for energy sector and state economics that are preconditions for sustainable development. The application of wind energy is important for Georgia. However the wind phenomenon is still under persistent scientific investigation its nature is still unknown. There are many reasons of its genesis. After NASA's Earth Observation Mission program many new data has been gathered that clarify many phenomena from different point of view. The real drivers of climate are the Sun's insolation (light and heat), its magnetic flux, and the relative position and orientation of the Earth to the Sun.

Geomagnetic storm is a major disturbance of Earth's magnetosphere that occurs when there is a very efficient exchange of energy from the solar wind into the space environment surrounding Earth. These storms result from variations in the solar wind that produces major changes in the currents, plasmas, and fields in Earth's magnetosphere. The largest storms that result from these conditions are associated with solar coronal mass ejections (CMEs) where a billion tons or so of plasma from the sun, with its embedded magnetic field, arrives at Earth. CMEs typically take several days to arrive at Earth.

The correlation between geomagnetic storms and meteorological elements (wind, pressure, temperature) for Georgian region using meteorological observation and NASA's Solar Dynamics Observatory and NOAA Space Weather Prediction Center data has been conducted. The results show that there exist dependence between weather parameters and income radiation. Especially important is wind parameter variability investigation. Such research hasn't been carried out yet in Georgia and is important for space weather researches.

Keywords: Wind energy, wind velocity, disturbed atmosphere, geomagnetic storm, geomagnetic indices.