Rich Internet Applications for Interactive Visualization of Geophysical Data: Approach, Architecture, Technologies

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The proposed software solution is a tool developed for the analysis, forecast and dynamic visualization of geophysical data, which is collected and provided by a set of spatially distributed heterogeneous data repositories. They include ground magnetic observatories and variation stations, satellites, as well as various numerical models based on geophysical standards and specifications. The technological stack is limited with the tool's web-based implementation and represented by integrated client- and server-side technologies. Client-side implementation is represented by several markup, styling and interaction software technologies, which are HTML5/CSS3/JavaScript with geospatial ESRI ArcGIS API for JavaScript. Django web framework based on the "Model – View – Controller" architectural model represents server-side implementation, where Python is the main programming language used for the application's business logic.

The complete Web-based GIS represents a web portal with a set of services providing a rich instrumentation for the appropriate geophysical data analysis, processing, and visualization. Each tool upon execution provides an interactive

geospatial image, which is generated according to the user request parameters or by default date-time settings. The proposed web services are freely available at http://aurora-forecast.ru and https://geomagnetic.ru. Currently, the services monitor in real time the following geophysical parameters: The probability of observing the aurora, the spatial distribution of the electric potential in the polar cap, the conductivity of the ionosphere, space weather parameters at the first Lagrange point (L1), etc. And also, based on retrospective data, the global the nature of the spatial distribution of geomagnetic disturbances.