Expert Earthquake DataBase - geographic shell for seismological researches.

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This paper is presenting one of geographical systems for the natural phenomena - the program shell Expert Earthquakes Data Base (EEDB). It consists of 3D relief map of the world with moving frame of the area selection; geographical layers of rivers, continents contours, cities and of many other information. Additionally, it includes several seismological catalogs (Historical NEIC World Catalog; authoring complex Baikal catalog; regional Altai catalog, etc.), and also some the built-in algorithms of the earthquakes prediction. EEDB shell was made on the basis of Pacific tsunami directory software [1] and was adapted to seismological tasks of a global scale.

Originally, EEDB for the World was developed as a directory system to provide the seismological information to the academic community, the private sector, and to governmental agencies, who use, need, produce, handle, archive, or are concerned with or about earth-science data sets. Subsequently, this system has gained functions of the research and development system. It was supplemented by such programs for scientific researches as: dynamic algorithm of the separating of aftershocks from seismic catalogs, the different methods of finding of the seismic anomalies, the programs of visualization of diagrams and graphics for various parameters. The possibilities of earthquakes' distribution cluster analysis, an epicenters' mechanisms graphics visualization and other types of spatial analyses for geographical areas are added. All these tasks methods are described in given article.

For example, the technology of aftershocks sequences selection contains the following stages:

1. First pass of the catalogue with the purpose of finding not-aftershock events density (aftershocks are eliminated on the parameters retrieved by a statistical method),
2. Second pass when the preliminary aftershocks are selected for a rectangular cell which size is proportional to magnitude of a main shock,
3. Construction on the selected plenty of an events concentration ellipse by the method of the greatest probability or by standard deviation from set center (at the researcher choice),
4. Subsequent passes of the catalogue with level-by-level aftershocks selection in the elliptic metrics.

The EEDB is already widely used the cleared by this method catalogues for scientific researches: for construction of diagrams of repeatability of events on selected sites; for research of seismic quiescence zones; for obtaining of various statistical allocations of quantity and density of earthquakes relatively of time and space and other premonitory seismicity methods realization.

In the task of finding of seismic anomalies before strong earthquake the most different parameters of earthquakes are calculating. One method learns the spatio-temporal allocation of total energies for selection of seismic quiescence zones before strong earthquake [2]. The other one researches the behaviour of an inclination a graphics of events repeatability (coefficient b) for selected region (pic.1).

The theoretical results of these and other researches, realized in EEDB-system, are presented in [2], [3], etc.

The EEDB geographical package is written on Visual C++ and run under Windows 98 and more, NT and XP. All catalogs are in special EEDB-format. Input worlds' hypocenters data are kept, updated and handled with using of standard dbf-format. Conversion into EEDB-format is carried

out by the separate program. Format of the earthquake events file consists of the fields of temporary, spatial coordinates and energy parameter (magnitude or energy class).
In addition to output into a map of the hypocenters of selected earthquakes, the system allows to visualize the lines of fractures, points of magnetic characteristics measurement and other spatial data.
The EEDB graphic shell has been designed with an "easy-to-learn" and "easy-to-use" graphic interface, that encourages a "try and see" approach to its learning. So, the most effective way is simply to run the system and to explore its possibilities.
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Fig.1. The example of the work of scientific geographical system EEDB.