

# The new user interface for the development of hydrometeorological support based on integrated data

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For solving applied tasks (AT) separate data set or database are usually used. One of the most important approaches for organizing complex processing of distributed and heterogeneous data is their preliminary integration. The general scheme of the functioning of the hydrometeorological support system of enterprises includes the following steps: configuring of information resources (IR), tools, representations; search (filtering) data; calculation of statistical characteristics and calculation of new parameters; representations of parameters values.

The configuring is intended to include in the AT profile of the necessary data; of services for calculating trends, anomalies of one or another parameters; of extrema in the selected area or over a period of time; of average values based on a time series at points or regions based on tuned IRs.

If the IR represents a wider region, then by tuning for the geographical area, parameters, spatial and temporal resolution scales, type of representation (points, polygons, trajectories, profiles) for each AT appropriate subsets of data are selecting or filtering.

Based on the available IRs using services, statistical characteristics (averages, extrema, trends, anomalies, and others) and indicators are calculated. For the observed, calculated and prognostic values of the parameters, dangerous levels are indicating by using their local threshold values. For implementation these functions, a toolbar is used - this is a set of buttons and drop-down lists for performing actions with selected data. Examples of tools are the weather monitor for every station, the meteogram - a graph of changes in parameters along any trajectory, a forecast at a point or region, calculation of trends, anomalies in a point, along a trajectory or for region. Depending on the type of IR, the buttons appear on the toolbar: animation for the appointed period, calculation of new indicators, viewing graphs, meteogram, report editor, subscription on data, and metadata on IR.

The form of representation of observed, calculated and forecasted parameters depends from:

- type of data marked in the metadata on the IR (point, grid, profile, catalog of objects);
- type of platform (fixed point - it is possible to generalize data for a time series; dynamic platform - changing parameters along a trajectory is built);
- presence of geographical coordinates (it is possible to build the spatial distribution of parameter values in the form for points or isolines);
- availability of date, time (it can build a time series), for example, for observations in a fixed point can plot graphs.

The "Graphs" section may include the construction of several figures of the time course at different points for comparison. Using the catalog of spatial objects with coordinates and time can be search satellite images. The "Reports" section is forming based on of the including of the necessary maps, graphs, and tables and the corresponding explanatory text. To accelerate the receipt of individual ready-made results, "Hot keys" are used, with which it can get a list of

current natural disasters; look at local threshold values of indicators; show available reports. The scheme of the AT functioning shown in Figure 1.

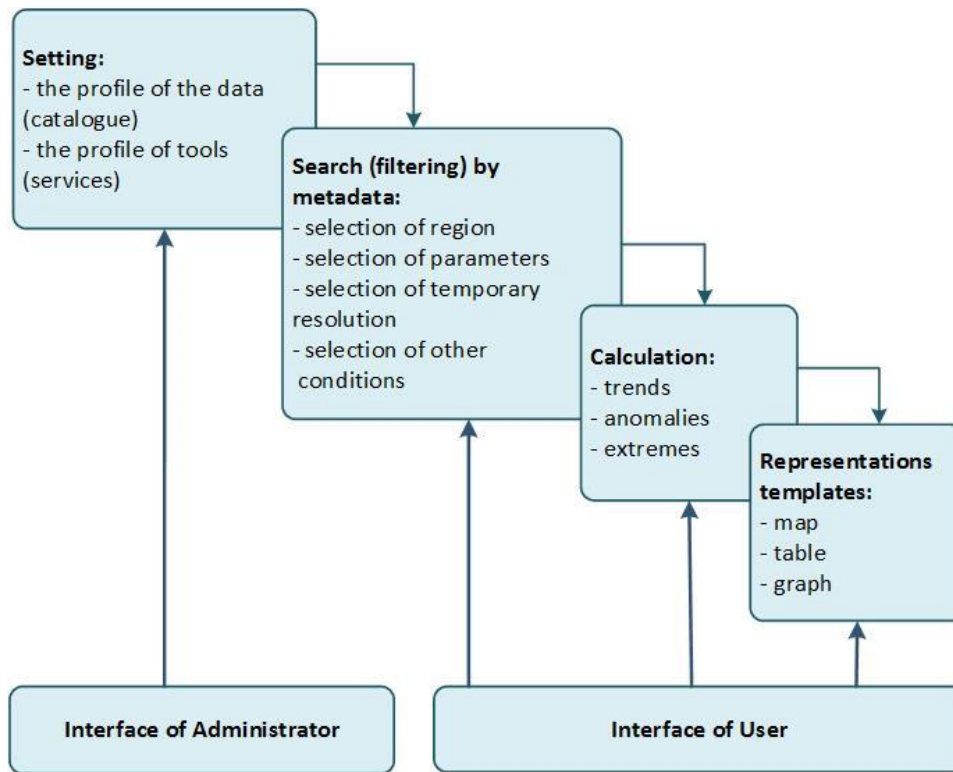


Figure 1: General scheme of the AT functioning

The following AT identified disasters monitoring, climate assessment, climate monitoring, support of long-term forecasting, and transport operations. The "Climate monitoring" AT (<http://portal.intaros.meteo.ru/portal/intaros/services/>) is intended for obtaining climate change indicators in the Arctic and individual seas at various temporary resolution (month, season, year, multi-year summaries) and of estimates climate change. The AT includes a diagnosis of climate change in the Arctic based on data of coastal and synoptic stations, observations in the open sea; identification of extremes. The parameters presented in the IRs include monthly and annual average, minimum, max values of atmospheric pressure, air temperature, wind speed, precipitation, wave height, permafrost active layer, river flow, sea ice, and sea level. The indicators obtained based on basic IRs include anomalies, trends of the parameters; monthly values of anomalies. Panels includes a selection of parameters as radio-button, a group of check boxes for selecting the sea. The panel "selection temporary resolution" includes a radio-button and slider. It needs to select a specific month (season or year), period for multi-year values. Tools include calculating trends, anomalies, extrema at a point and for a region.

For the first time, it is proposed not only to visualize a particular IR (array or database), but to enable the user to configure his task to the necessary resources from those available in the integrated database. A new method is presenting for universal process of processing and visualization of environmental data in various forms (maps, graphs, tables, and reports) and providing consumers with access to them in the "self-service" mode.

The presented approach develops the use of heterogeneous, distributed and integrated data for solving applied problems related to monitoring the hydrometeorological situations, with preparing results for analyzing the current situation, with calculating indicators and decisions support.

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