Decision support system for disasters based on integrated database – output of possible impacts and recommendations for decision makers

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Problems of using environment data

Decision-makers use the information by intuition or depending on their experience

Due to the large amount of information a decision-makers is no unable to respond enough fast to take into account changes in environmental conditions

Decision-makers do not always know exactly how to and when to use the observing, forecast and climatic information

Features of using of information about the natural environment

■ The same environmental conditions are repeated very rarely, this leads to the fact that the knowledge, collected by decision-makers, is lost.

■ Damage from a bad using of information about the environment is sufficiently big, and hence the high cost of error from improper use of the information

■ The number of possible situations is enormous, a set of rules is limited, therefore it need to create a database of critical values of the indicators for each object

The principles of information dissemination about natural disasters

Personalization of information - only what need at a moment of natural disaster, for a certain enterprise, technological process, management level, region

Mobility - delivery of information to any mobile internet-device

Automation of delivering of information about disasters for decision-makers

Automatic using of information for each object

The formalization of business processes which define the organization of works to increase the safety of the population and industrial enterprises

Classification of impacts and recommendations (before, during, after disasters)

The permanent using of information on the environment conditions by scheme:

MeteoAgent application

**Appointment:** Automatic informing to decision-makers

Tasks:

■ Assimilation of storm warnings
■ Identification of natural disasters on a basis the observation, analysis and forecast
■ Transfer of the messages on smartphone, IPad
■ Creation of means of transition to analytical applications and cartographical services for more detailed of receiving information

Advantages: The decision maker pays attention to a situation only when the object is in danger.

Services :

■ Notifies users about natural disasters
■ Gives the decision-makers additional information on a hydrometeorological situation
■ Provides the information on impacts of natural disaster and recommendations for decision-making
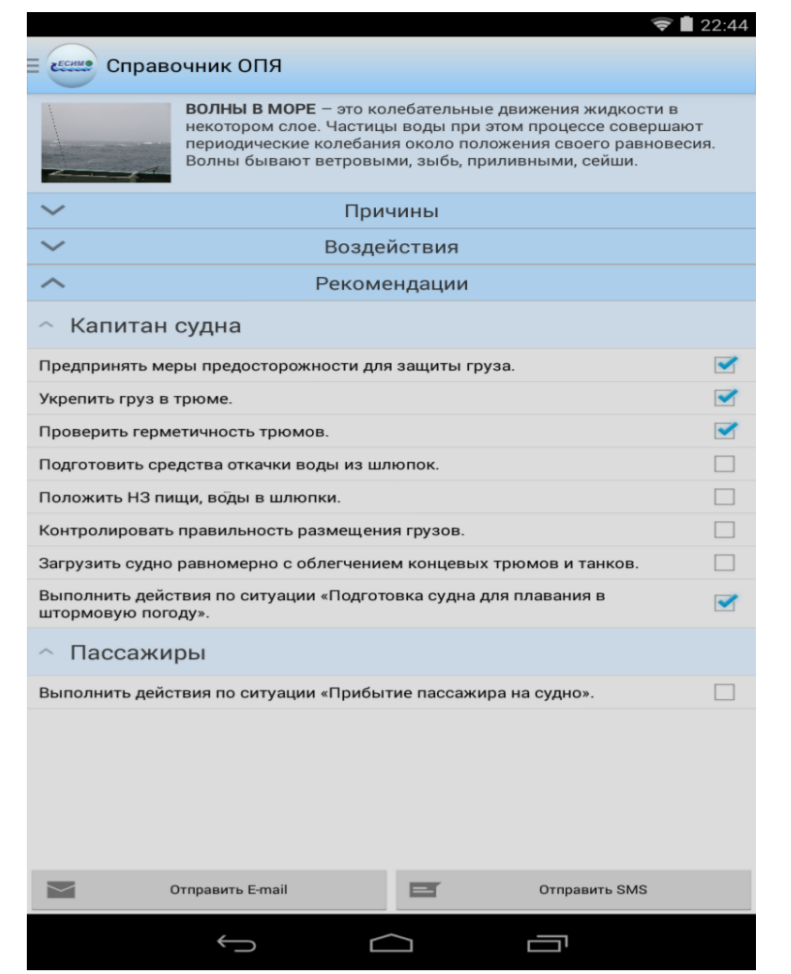
Monitoring - Forecast - Warning - Preventive actions - Analysis of a results - Strategic planning - Monitoring

Necessary to reduce the time for delivering the information about natural disasters

Decision makers need:

A warning message about exceeding of the critical values for a every object and the technological process, taking into account season and climatic zone

Information about the risk

Information about the impacts

Information on possible losses (the consequences)

Recommendations for decision-making

The cost of preventive actions

The choice of alternative decisions for situations - a forecast success rate or not, a preventive actions were carried out or not

Model of the description of a situations on natural disasters

Name of natural disaster

Definition of disaster

Disaster reasons

Photos with examples of disaster

Objects of impacts (population, port, vessel, agriculture, etc.)

The name of technological process on object on which disaster can impact Indicators of impacts and their values

Level of danger

Related phenomena Information sources

Type of information (climate, forecast, in moment, or after disaster)
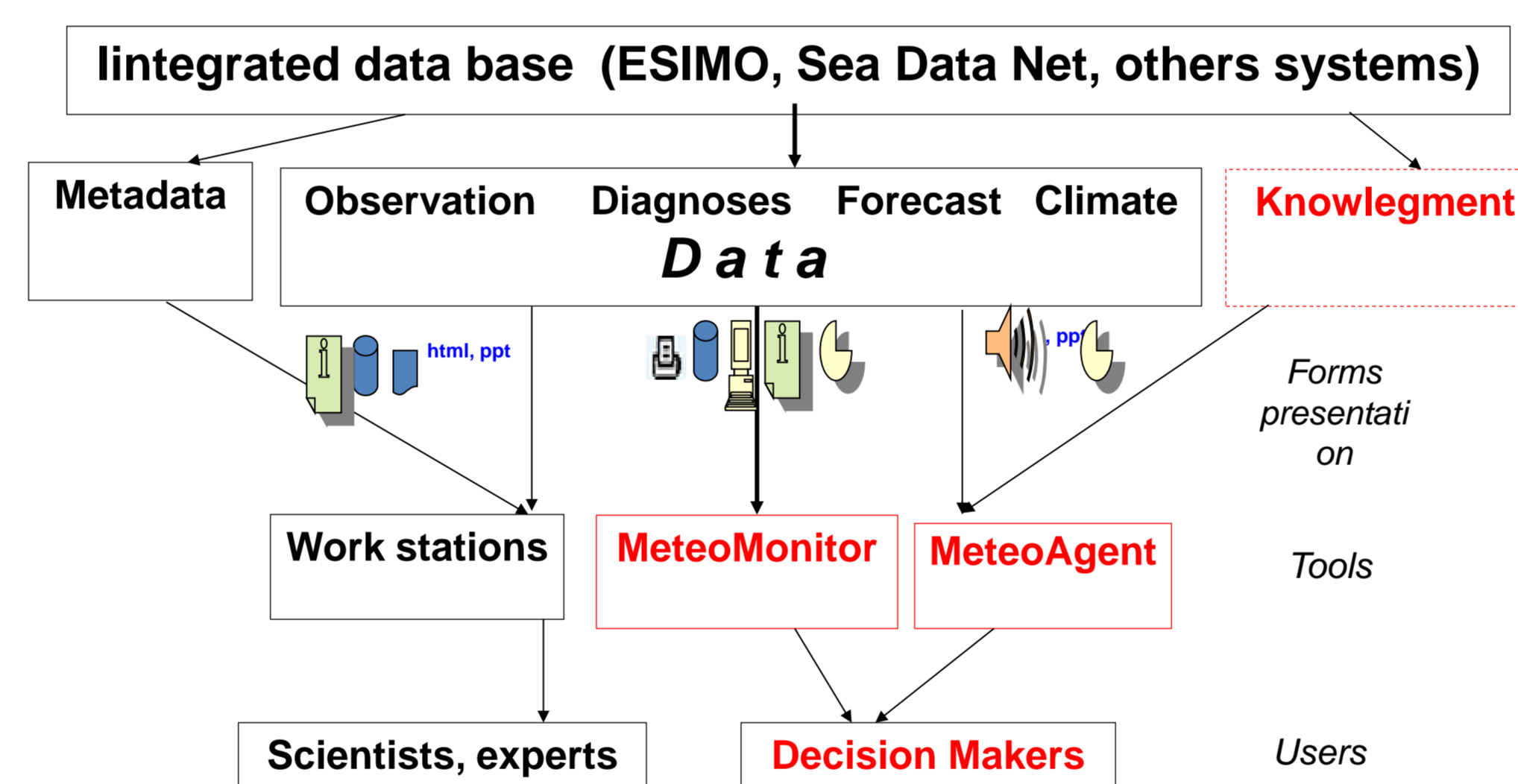
Impacts :

- name,
- technological process -type activities for objects of impacts (the parking in port, transition across the ocean)
- priority
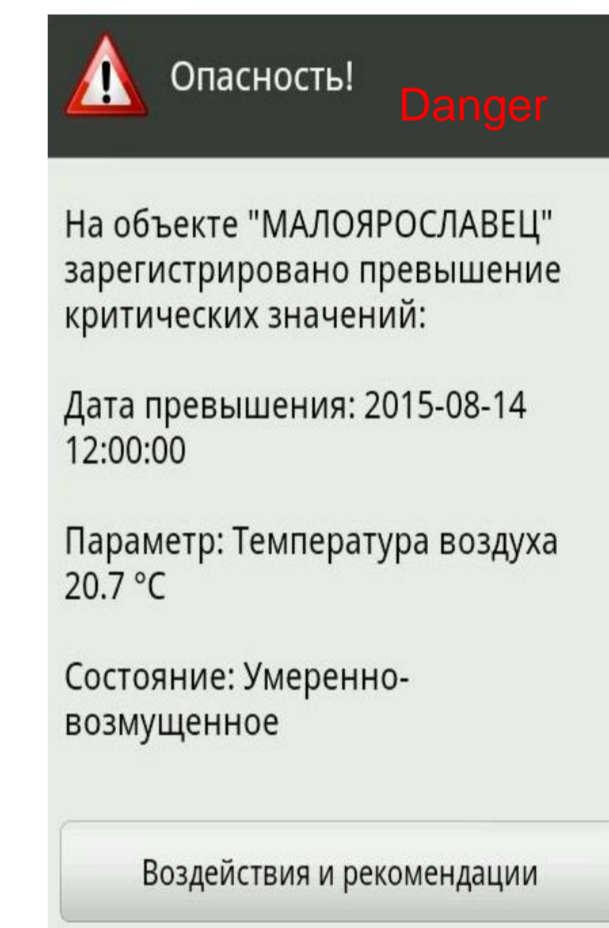- author,
- possible damage

Recommendations :

- name,
- level of management,
- priority,
- author,
- the cost of preventive actions,
- links on standard recommendations

## The development scheme of information services

Iintegrated data base (ESIMO, Sea Data Net, others systems)

Metadata | Observation Diagnoses Forecast Climate **D a t a** | **Knowlegment**

Forms presentation

Work stations | **MeteoMonitor** **MeteoAgent**

Tools

Scientists, experts | **Decision Makers**

Users

MeteoMonitor software

■ Visualization of parameters values on the map

■ Indication of parameter values : If value of parameter exceeds critical, the zone of these values is displayed in the corresponding color (green, yellow, orange, red)

■ Automatic joint of observed and forecasting data on one graphic

Notification of users information about disasters

Опасность! **Danger**

На объекте "МАЛОЯРОСЛАВЕЦ" зарегистрировано превышение критических значений:
Дата превышения: 2015-08-14 12:00:00
Параметр: Температура воздуха 20.7 °C
Состояние: Умеренно-возмущенное

Воздействия и рекомендации

On station "Maloyaroslavets" the excess of critical values is fixed.
Date: 2015-08-14 12:00
Air temperature: 20.7 °C.
Danger level: yellow

Scheme of Decision support system for natural disasters

The main idea: Knowing conditions of the environment is possible define the list of possible impacts on object in advance, knowing impacts, it is possible to define recommendations for acceptance of preventive actions for various levels of objects management in advance.
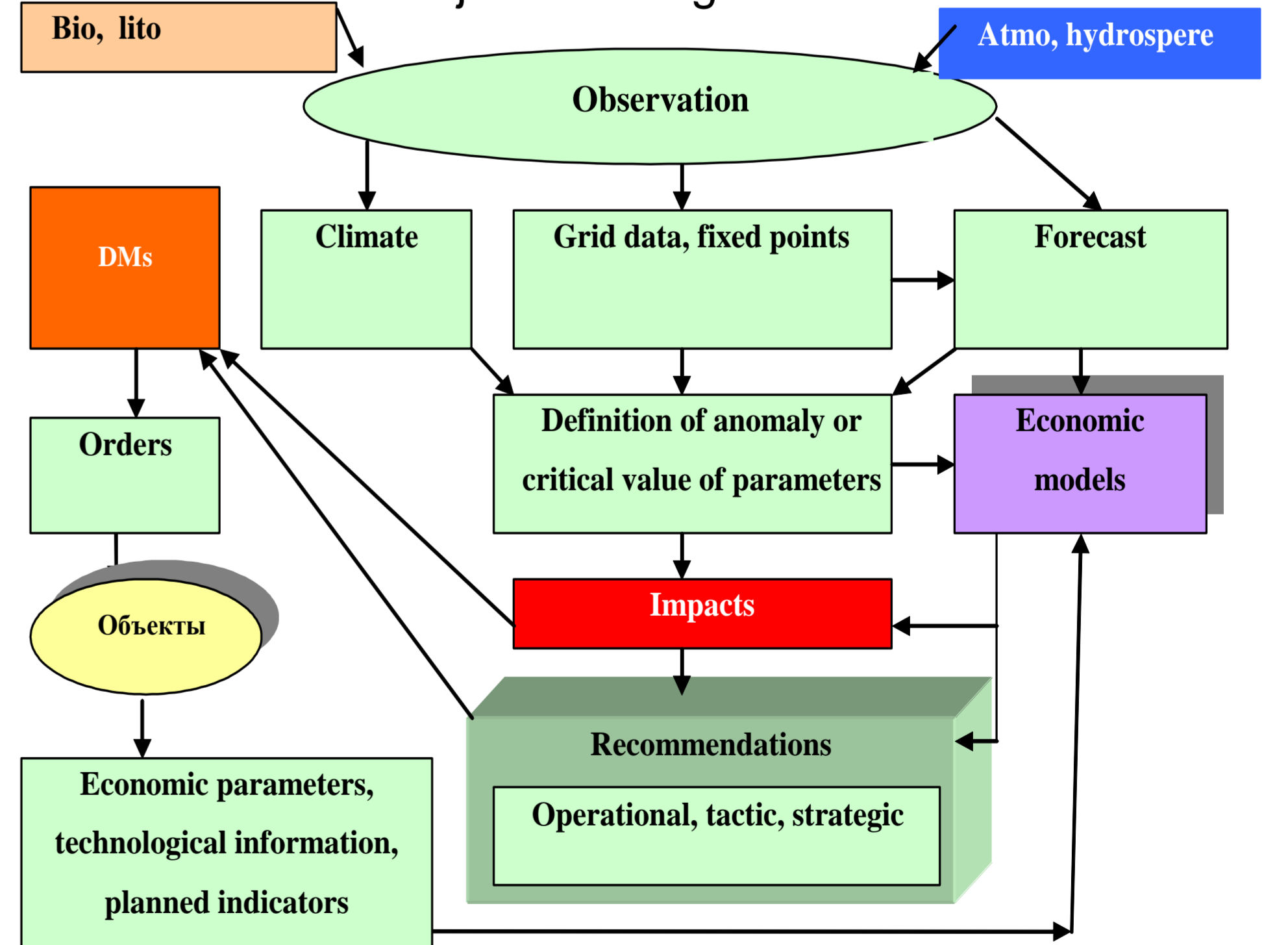
The new tasks, which can be to solved with the aid of DSS:

Automatic delivery of information to mobile devices of decision makers

Automatic delivery of the observing and forecasted information on natural disaster to ships, drilling platforms, etc.

Automatic delivery of the observed and forecasting information for indicators which the municipal decision maker are defined how danger

The automatic notification of population about the disaster and a information on possible impacts and recommendations