



State Environmental Monitoring in Poland

Organisation of Integrated Monitoring of Natural Environment

Anna Katarzyna Wiech

**Chief Inspectorate of Environmental Protection
Department of Monitoring, Assessment and Outlooks**

Andrzej Kostrzewski

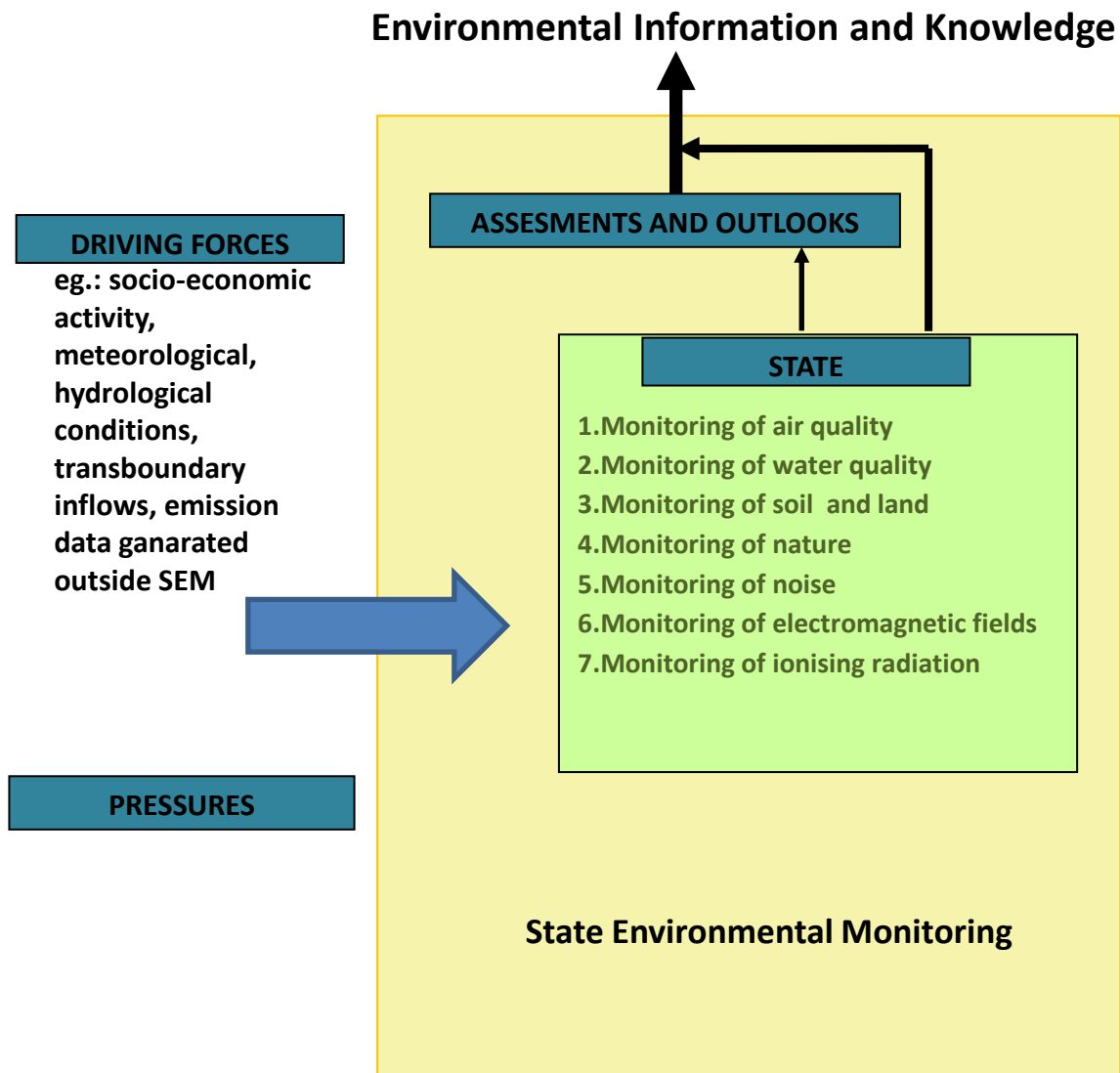
Adam Mickiewicz University in Poznan



- Structure and organization of State Environmental Monitoring System
- State Environmental Monitoring (SEM) – its scope and place in environmental governance cycle
- Methodological and method-based assumptions of Integrated Monitoring of Natural Environment
- Organization of Integrated Monitoring of Natural Environment (IMNE) and its significance in the protection of Polish natural resources and landscape structure

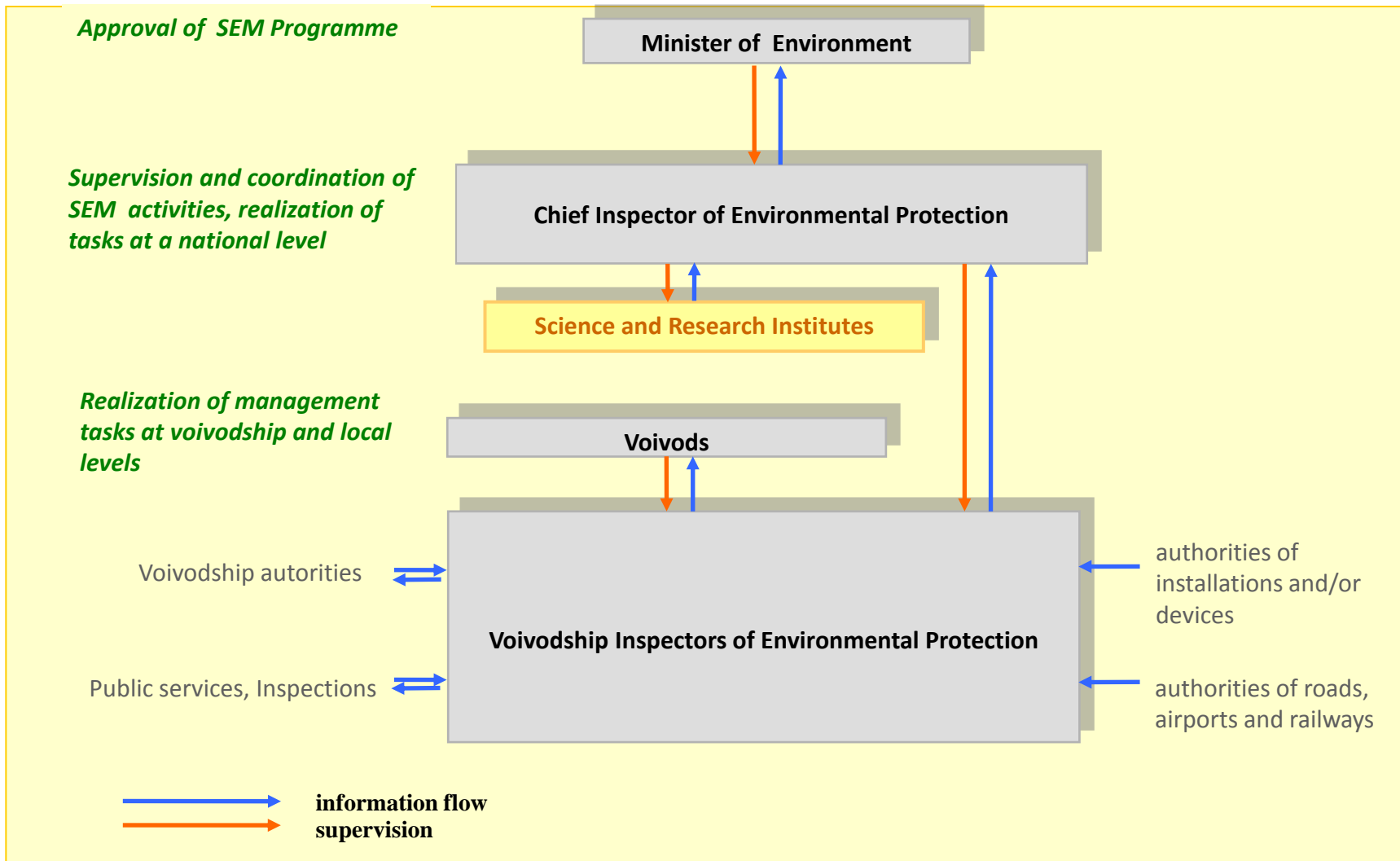


Structure of State Environmental Monitoring





Institutional organisation of State Environmental Monitoring System





SEM – AIR QUALITY MONITORING

SEM air quality monitoring network, operated by Voivodship Inspectorates of Environmental Protection (VIEPs), covers:

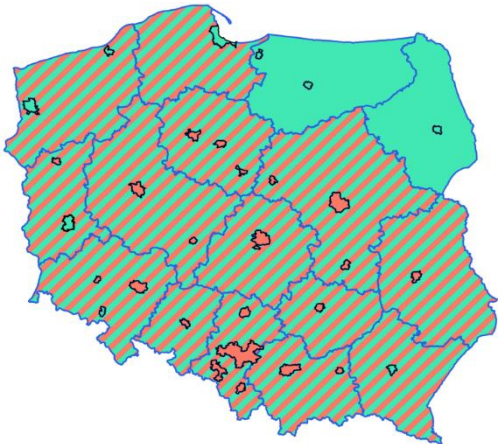
- **650 automated analysers (SO₂, NO₂, NO, NO_x, CO, O₃, BTX, PM₁₀ and PM_{2,5}, Hg),**
- **184 gravimetric low volume samplers for PM₁₀ or PM_{2,5}**

Altogether, SEM AQ includes approx. 300 automated measurement stations

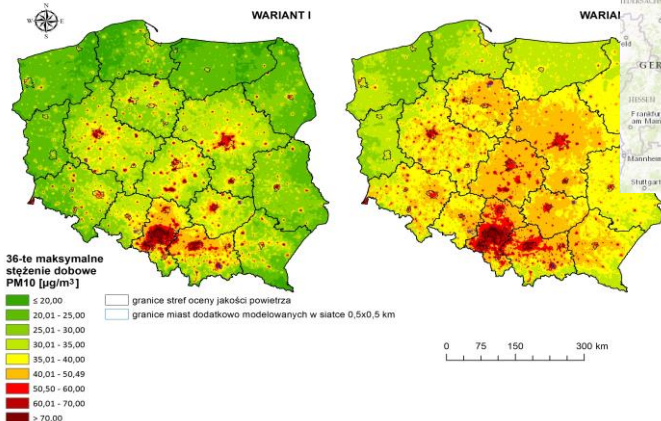


SEM - AIR QUALITY MONITORING

AQ annual assessments in Poland

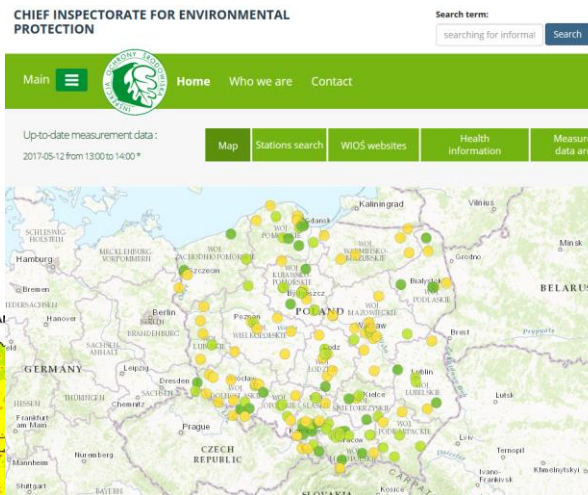


Klasyfikacja stref w 2016 roku
Klasa wg parametrów – PM10 – 24h, zdr.



AQ national information system

Air Quality Portal – maps with up-to-date air quality data



PL AQ Index



SEM – SURFACE WATER MONITORING

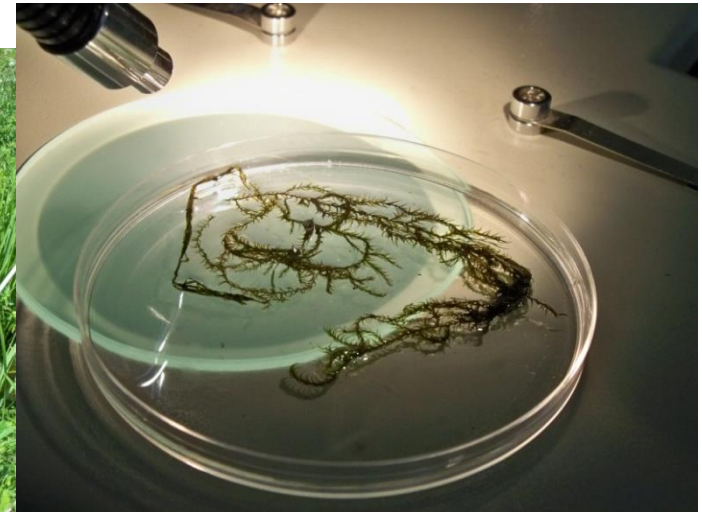
Surface water monitoring according to WFD (surveillance, operational, investigative) is run by VIEPs in rivers, lakes, transitional and coastal waters. Analyses are done in VIEP laboratories.

Monitoring scope:

- 1) phytoplankton (chlorofil a),
- 2) phytobentos (multimetriks IOJ),
- 3) macrophytes (multimetriks ESMI),
- 4) phytoplankton (multimetriks PMPL),
- 5) ichtiofauna (multimetriks LFI-CEN i LFI+),
- 6) benthic macroinvertebrates (multimeteriks LMI)



Fot. P. Panek

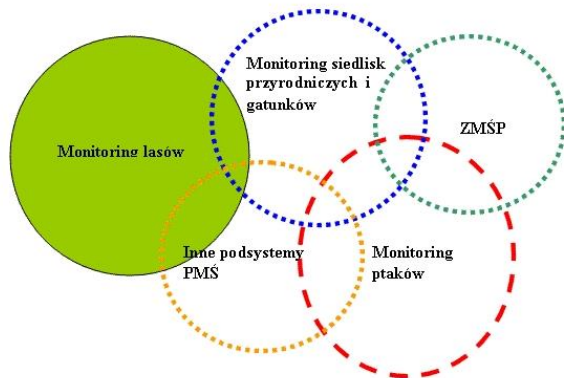


For ecological status classification and ecological potential classification some other physico-chemical elements are also monitored – oxygenation, salinity, acidification, nutrients, biogens, and if justified by emissions to water environment – also specific synthetic and non-synthetic pollutants.

For chemical status classification VIEPs monitor priority substances (directive 2013/39/EU) in surface water, sediment and biota, as well as other hazardous substances posing substantial risk to water environment.

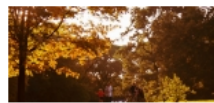
SEM – NATURE MONITORING

- Provides assessment of the impact of environmental changes on biotic and abiotic elements of our ecosystem to prevent negative results of these changes.
- Provides reliable data as the basis for the implementation of adequate protection measures for species and habitats.



Monitoring przyrody

Informacje ogólne o podsystemie monitoringu przyrody



Prowadzenie monitoringu przyrodniczego różnorodności biologicznej i krajobrazowej w tym sieci Natura 2000 w ramach Państwowego Monitoringu Środowiska jest obowiązkiem wynikającym z art. 112 z ustawy z dnia 16 kwietnia 2004 roku o ochronie przyrody, która implementuje zapisy Dyrektywy 92/43/EWG w sprawie ochrony siedlisk naturalnych oraz dzikiej fauny i flory (tzw. Dyrektywy Siedliskowej) oraz Dyrektywy 79/409/EWG w sprawie ochrony dziko żyjących ptaków (tzw. Dyrektywy Ptasiej).

[więcej »](#)

Monitoring ptaków



Obecnie ptaki lęgowe są w Polsce monitorowane w ramach systemu jednostkowych programów dedykowanych poszczególnym grupom gatunków lub pojedynczym gatunkom. Każdy podprogram wykorzystuje metody dostosowane do specyfiki monitorowanej grupy ptaków.

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Monitoring gatunków i siedlisk przyrodniczych



Celem prac jest uzyskanie informacji o stanie zachowania gatunków i typów siedlisk przyrodniczych na wybranych stanowiskach.

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Monitoring lasów



Monitoring lasu, w postaci w jakiej funkcjonuje obecnie wywodzi się z potrzeby śledzenia zmian stanu lasu w okresie narastania procesu jego zamierania, które wystąpiło w Polsce w latach 80-dziesiątych. W powszechnej opinii, wysokie koncentracje zanieczyszczeń powietrza były główną przyczyną tego zjawiska.

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Zintegrowany Monitoring Środowiska Przyrodniczego



Zintegrowany Monitoring Środowiska Przyrodniczego (ZMŚP) funkcjonuje w ramach Państwowego Monitoringu Środowiska, a jego zadaniem w odróżnieniu od monitoringu specjalistycznych jest prowadzenie obserwacji możliwie jak największej liczby elementów środowiska przyrodniczego, w oparciu o planowe, zorganizowane badania stacjonarne.

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Publikacje dot. monitoringu przyrody



Biuletyny, raporty i inne publikacje związane z monitoringiem przyrody.

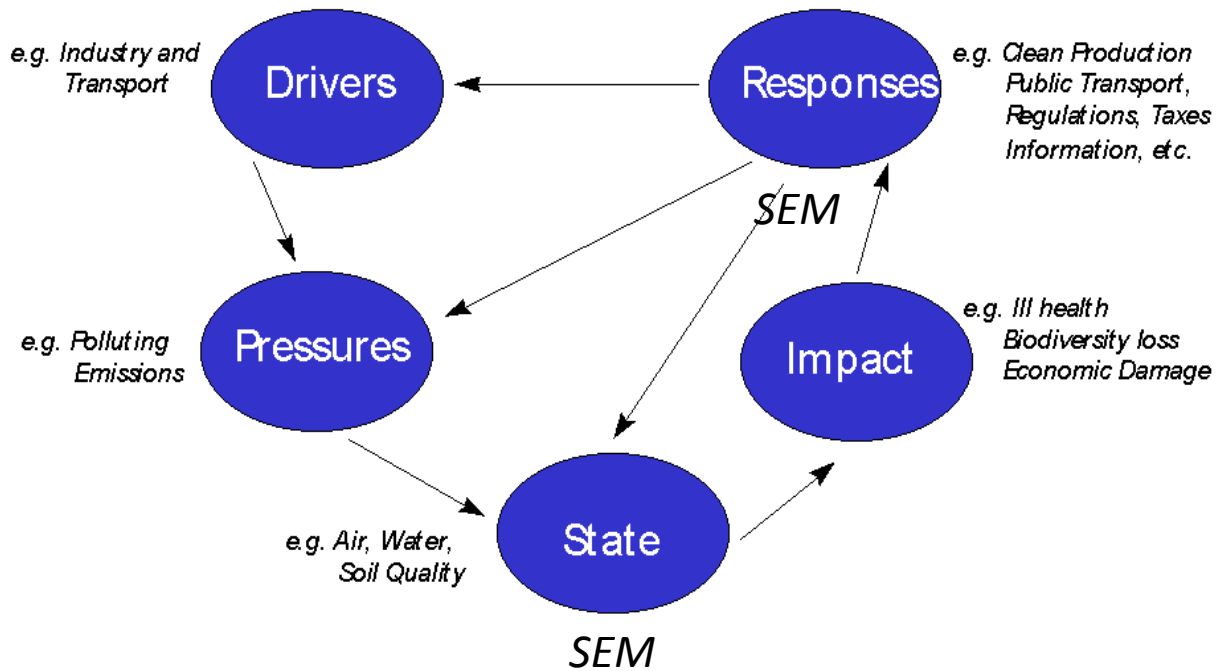
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SEM provides data, information and knowledge on:

- Present-day state and degree of pollution of particular components of the environment in regional, and national scale (with European context) to assess the effectiveness of improvement measures
- up-to-date information to the authorities and the public on ecological hazards in local, regional, national and global scales
- processes and phenomena in the natural environment
- Loads of pollutants delivered to the environment
- Dynamics of anthropogenic changes of natural environment
- Trends and outlooks - predicted results of „environmental consumption”

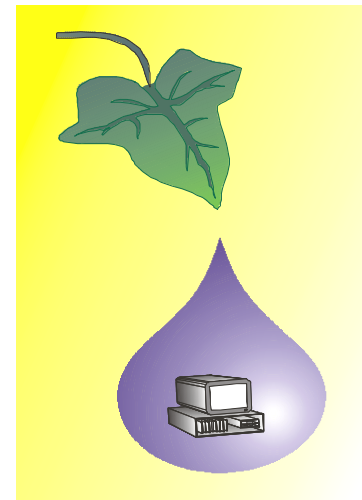
SEM in the DPSIR framework



DPSIR source: EEA



Integrated Monitoring of Natural Environment (IMNE) is a subsystem of State Environmental Monitoring, set up by the decision of Chief Inspector of Environmental Protection 11th May 1992



**The IMNE Center was set up by the decision No 152/2009/2010 by the Rector of Adam Mickiewicz University, Poznań 1st June 2010.
The IMNE Center is a university unit located at the Faculty of Geographical and Geological Sciences.**



IMNE assumptions

- is a part of State Environmental Monitoring
- in its methodology and methods used varies from specialised monitoring programs
- IMNE monitors geoecosystems functioning (in local and regional scales)
- IMNE is realizing the program of sustainability of landscape structure of Poland
- is a branch of landscape research, tending towards establishment of its own methodology and methods



IMNE objectives

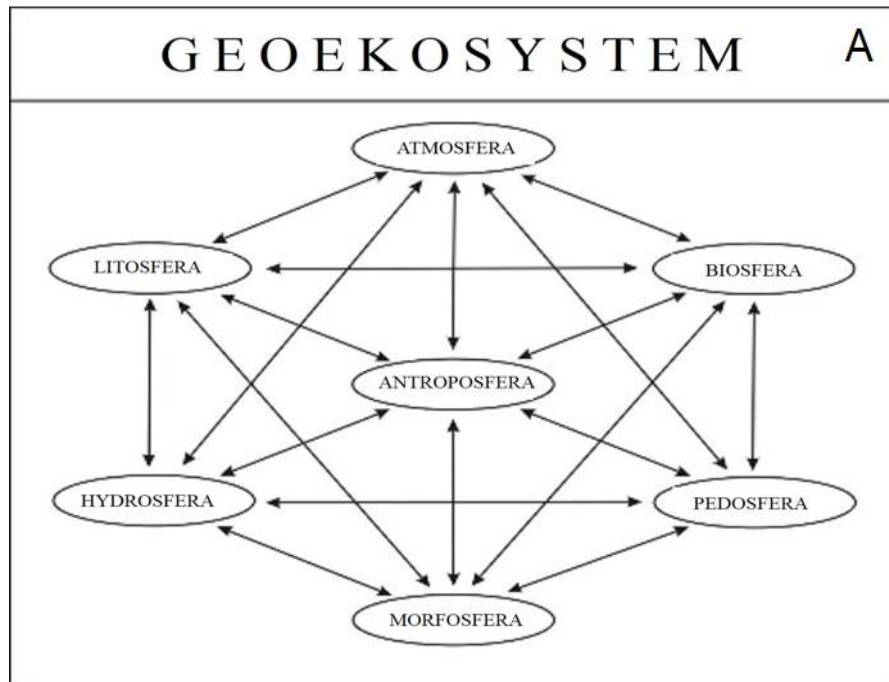
- The balance of energy and matter in a river and/or lake catchment
- The flow of the matter in the atmosphere-plant-soil profile-groundwater
- The monitoring (bioindication) of selected biological elements of the geo-ecosystem sensitive to changes in energy balance, biogenes and toxic elements
- Presentation of abiotic and biotic resources of surveyed geoecosystems and ways of their protection
- Identification of type and character of geoecosystems hazards and pointing at ways for their prevention
- Assessing the probability of occurrence of above-average, extreme and catastrophic events.



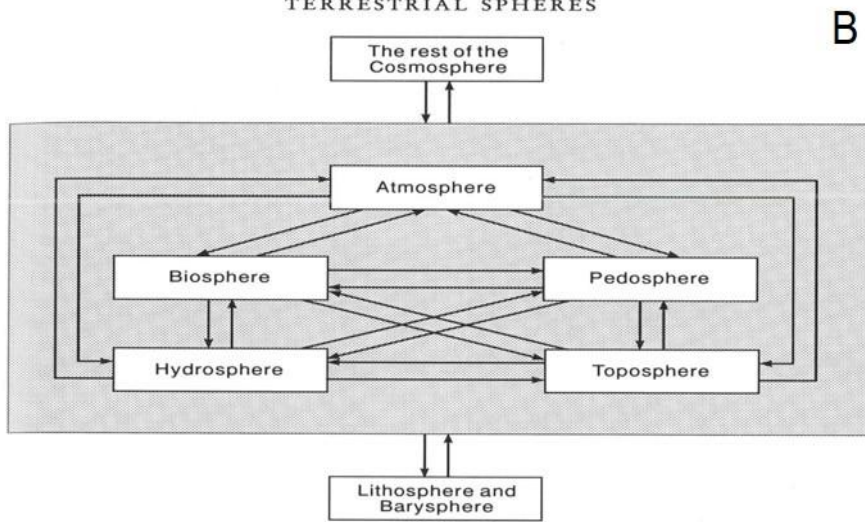
Geocosystem concept in the realization of IMNE program

River or lake catchment, treated as a geocosystem is a subject of IMNE investigations

Basic task of IMNE is to determine relations and dependences between particular spheres in relation to anthroposphere



TERRESTRIAL SPHERES



A – Kostrzewski (1993),
B – Huggett (1995)



IMNE MEASUREMENT PROGRAMS

Program code	Program name	Frequency
A1	Meteorology	Continuous registration, 1-3 times /day
B1	Air pollution	12/year 1/day
C1	Precipitation chemistry	12/year from week samples
C2	Under crown precipitation chemistry	12/year from week samples
C3	Stems flow chemistry	12/year from week samples
D1	Heavy metals and sulphur in lichens	Once/2 years
E1	Soils	Once/10 years
F1	Soil solutions chemistry	12/year
F2	Groundwater	Continuous registration, 1/month, 1/3 months
G2	Organic fall	1/year from monthly samples
H1	Surface water - rivers	Continuous registration, 1/day, 1/month
H2	Surface water - lakes	1/month, 1/3 months
I1	Rivers hydrobiology, macrophytes and channel hydromorphological assessment	2/vegetation season, 1/3 years
J2	Structure and dynamics of plant habitats (permanent plots)	1/5 years
J3	Monitoring of invasion alien species - plants	1/2 years
K1	Trees and forests damages	1/year, 1/5 years
M1	Tree epiphytes	1/year

ANALYTICAL PROGRAMS

Changes of land use; geocosystem services; water balance and biogeochemical changes of representative catchments modeling; assessment of river catchment functioning based on bio and geo indicators

ADDITIONAL PROGRAMS

IMNE Central Database; ecological analysis and assessment of the state and functioning of geocosystems; metrology of IMNE measurement systems; quality and control system of the measurements; extreme phenomena



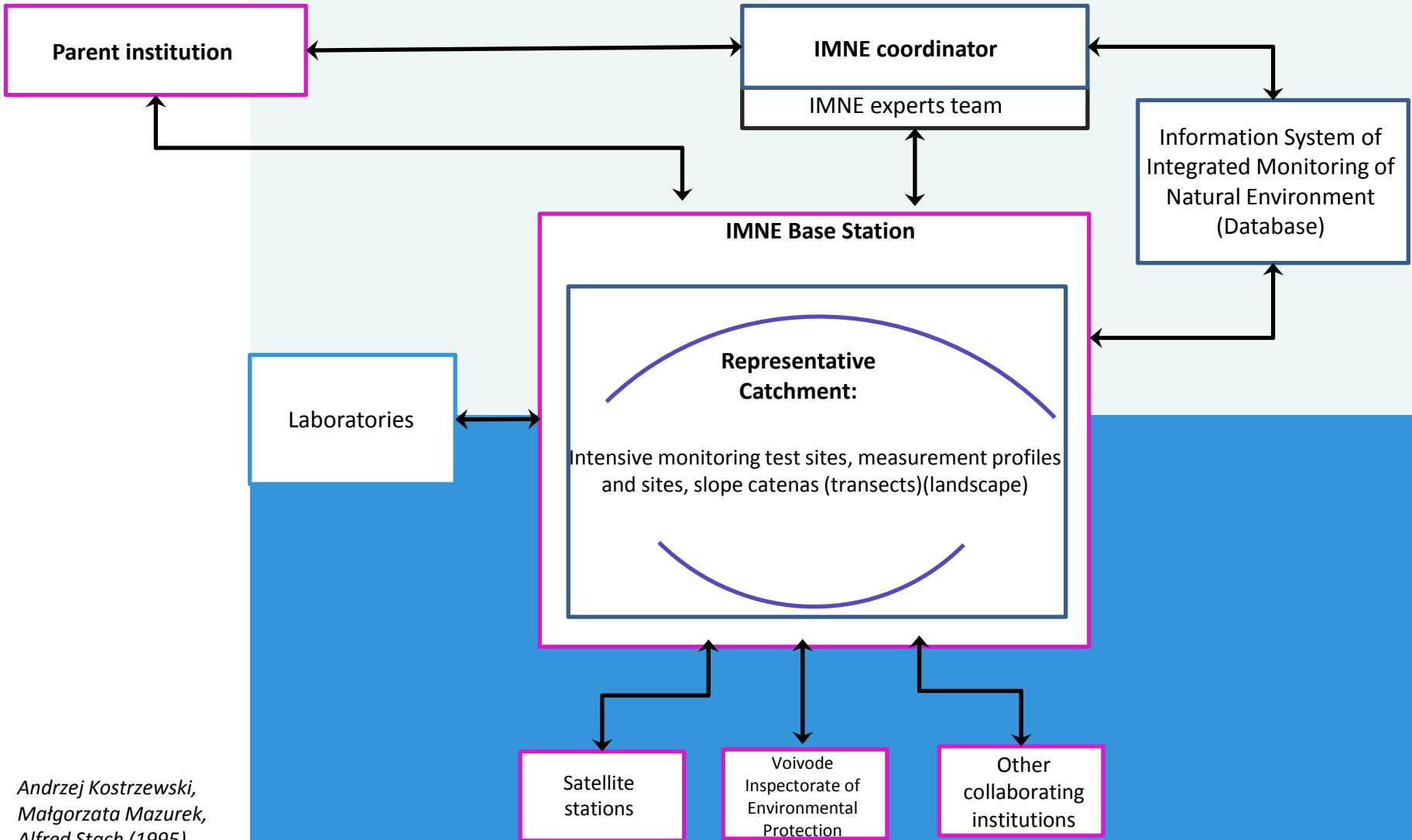
**RIVER AND LAKE GEOECOSYSTEMS RESEARCH IN POLAND SHOULD
CONSIDER THE FOLLOWING ORGANIZATIONAL ASSUMPTIONS:**

- Selecting river and lake geoecosystems in particular landscape zones of Poland for research and attributing them a range of experimental geoecosystems
- Organizing an integrated measurement system of river and lake geoecosystems functioning (supply, circulation, deposition and outlet of sediments) based on Integrated Monitoring of Natural Environment program
- Securing the long-term data acquisition, allowing the assessment of present-day state and changes of river and lake geoecosystems
- Elaborating various scenarios of geoecosystem development in conditions of climate changes and multi-directional human activity



STRUCTURE AND ORGANISATION OF IMNE BASE STATION

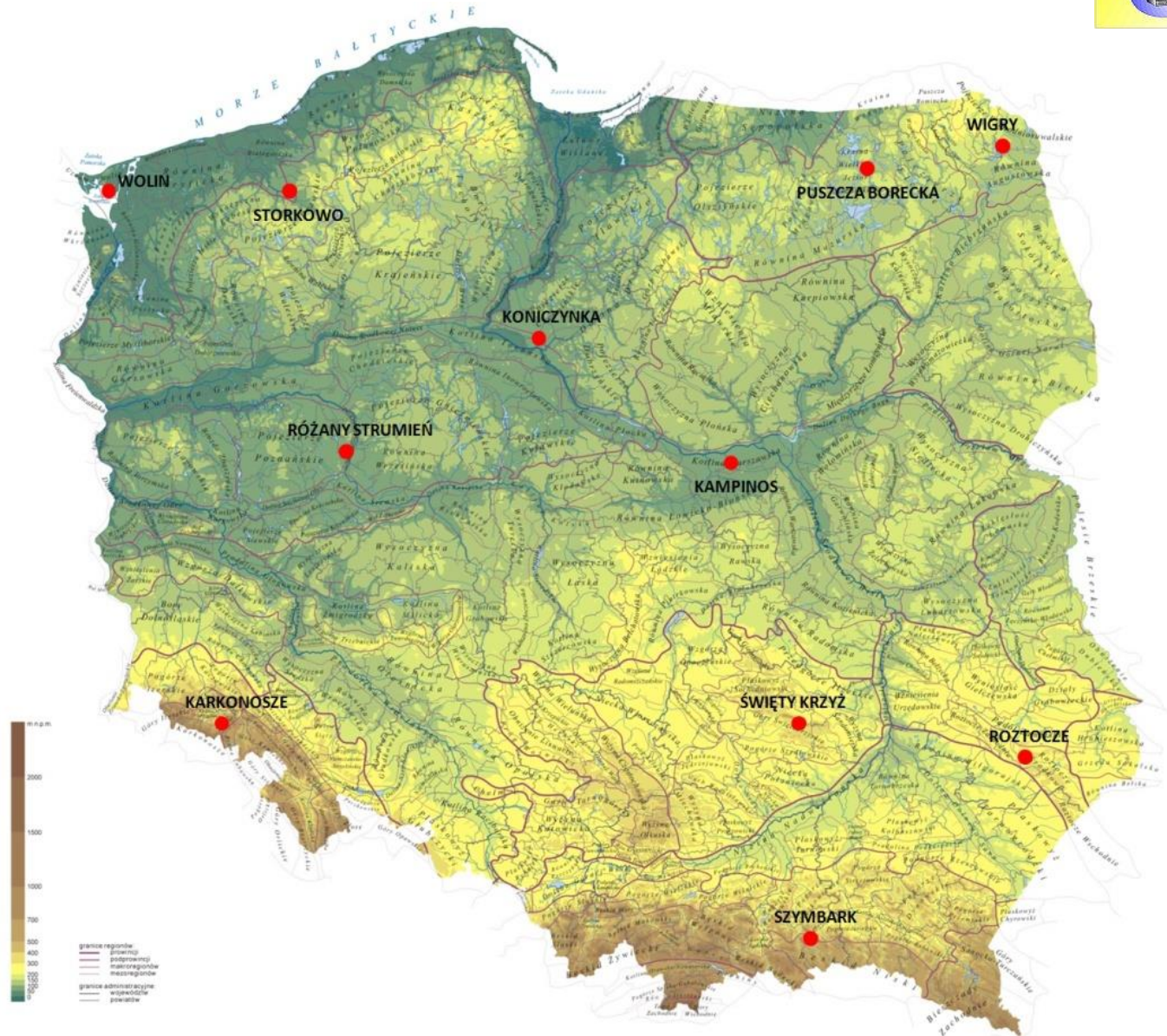
STATE ENVIRONMENTAL MONITORING



REGIONAL MONITORING



IMNE Base Stations



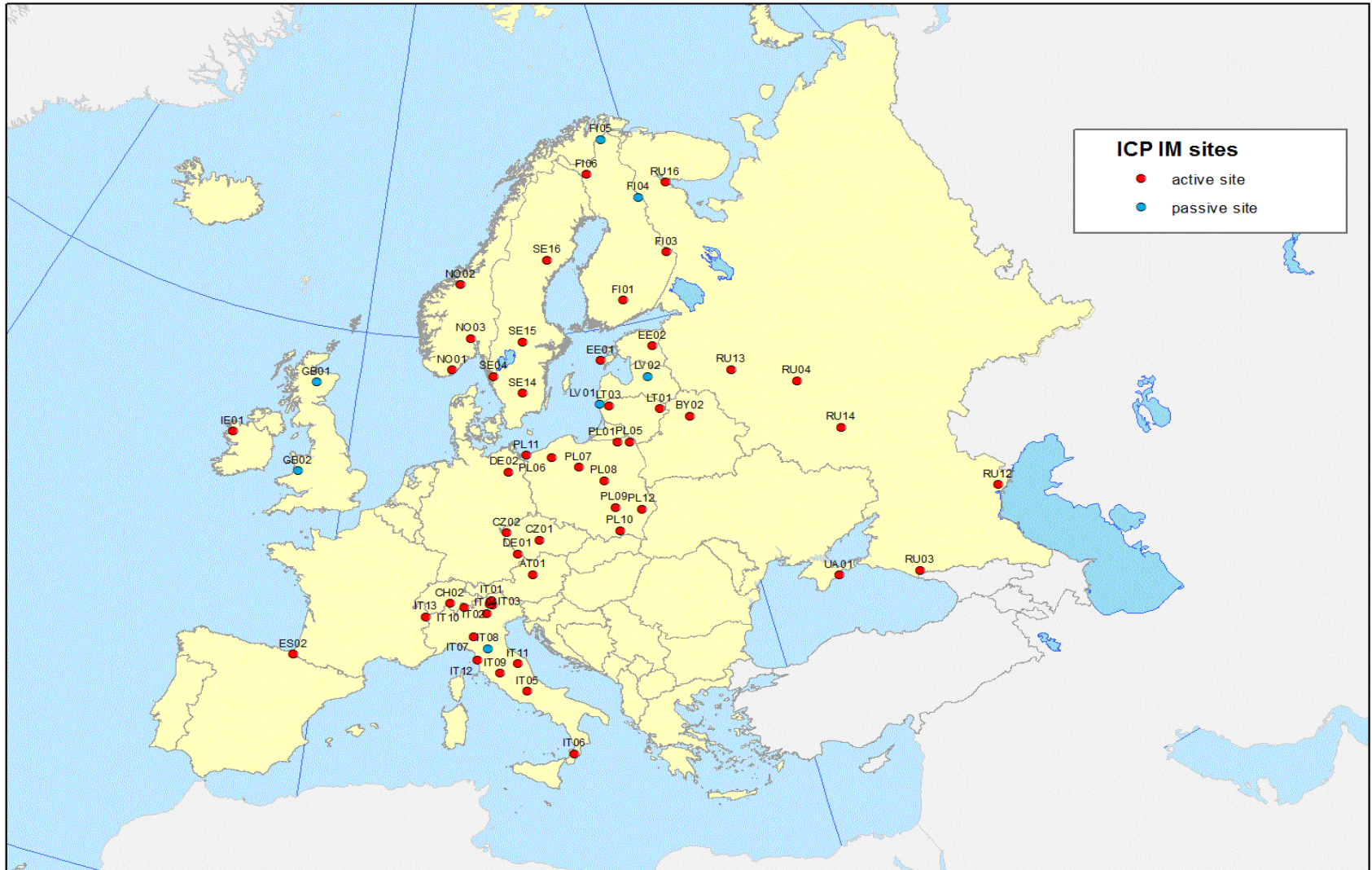


IMNE Base Stations in the structure of National Parks in Poland





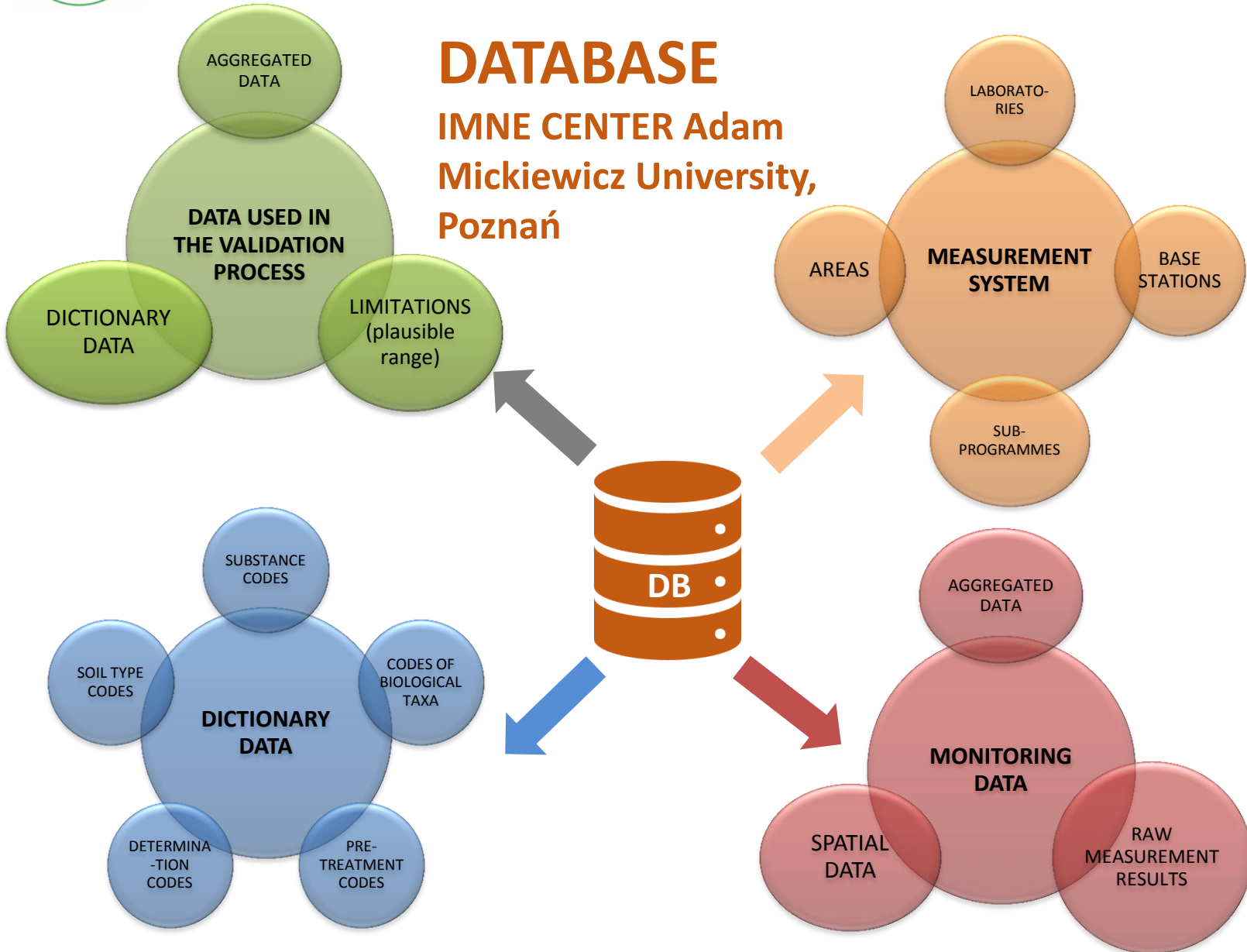
Geographical location of ICP IM





DATABASE

IMNE CENTER Adam Mickiewicz University, Poznań

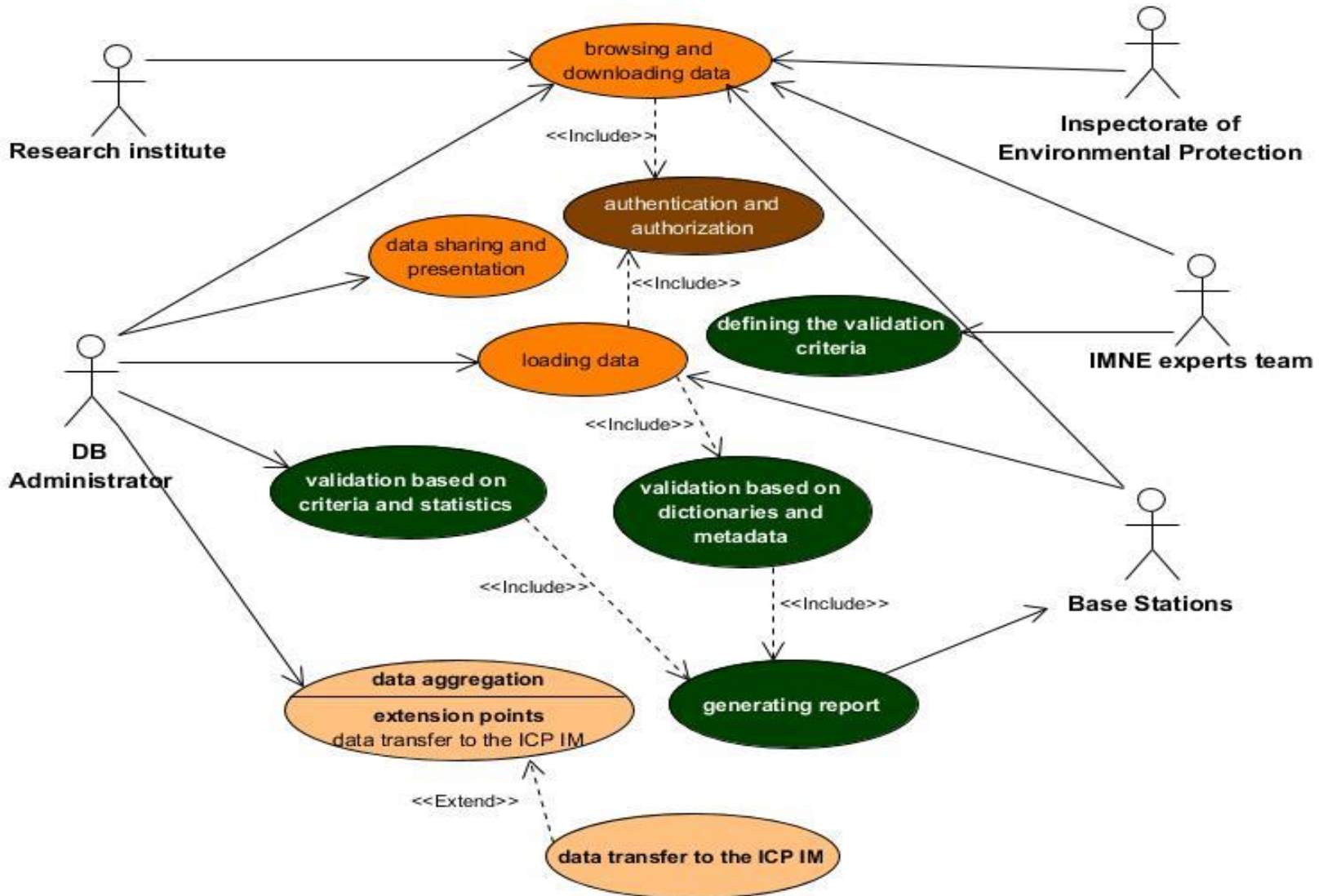


SOFTWARE USED:





SYSTEM FUNCTIONALITIES





Research and application problems of Integrated Monitoring of Natural Environment

- Recognition of natural environment functioning mechanisms in selected geoecosystems
- Recognition of energy and matter circulation in geoecosystems of different size and structure
- Threshold values of resistance of selected geoecosystem spheres vs. natural and antropogenic stimulants
- Extreme processes and their influence on geoecosystems functioning
- Water circulation pattern as a base for geoecosystems classification
- Criteria for geoecosystems typology as a base for regional devision at the national, voivodship level
- Geoecosystems transformations under climate change and human impact



Thank you for your attention!