Glossary

Please define any terms you feel need a definition here.

Research Project / Sensor Network

A research project is a temporary endeavour by one or more scientists, an institute or a scientific society with the aim of gaining new insights into an important or particularly topical research subject. As a rule, it is not financed from the institute's current budget, but mainly from third-party funds (research funds, public or industrial funding).

Reference: https://de.wikipedia.org/wiki/Forschungsprojekt

Research Network (Sensor Network Context): A system of spatially distributed sensors and instruments linked through communication technologies to collect, transmit, and often analyze environmental or scientific data for research purposes. These networks are commonly used in fields like climate science, hydrology, ecology, and geophysics. Reference: National Research Council (U.S.), 2006 – Environmental Data Management at NOAA or Open Geospatial Consortium (OGC), particularly the Sensor Web Enablement (SWE) framework

Example: GEOFON, IODP

Research Platforms / Facility

A research facility is a physical or virtual infrastructure that provides resources, equipment, and services to support scientific investigation, experimentation, and analysis.

A research platform is an integrated system—physical, digital, or hybrid—that enables data collection, sharing, and collaboration among researchers, often across disciplines and locations.

There is no single authoritative definition, but similar descriptions can be found in sources like the OECD’s Global Science Forum or research infrastructure policies from European Strategy Forum on Research Infrastructures (ESFRI).

Example: Boknis Eck Station, Research Vessel, Super Computing Center

Geographical Region

A geographic region is a broad area of the Earth's surface that is defined by shared charac-teristics such as physical features, climate, culture, political boundaries, or economic condi-tions. Regions can be natural (e.g., the Amazon Rainforest), administrative (e.g., the Euro-pean Union), or functional (e.g., a metropolitan area).

See ISO 19125 (Geographic Information – Simple Feature Access) and OGC standards on spatial data may provide further insights.

Disciplines

A branch of knowledge that follows systematic principles and methodologies to study specific aspects of the natural, social, or formal sciences. Examples include physics, biology, geology, and data science, each with distinct theories, methods, and applications.

Large discipline Nomenclatures are e.g.:

- UNESCO Nomenclature: Developed by UNESCO, this system classifies fields of science and technology using 2-, 4-, and 6-digit codes. en.wikipedia.org
- International Science Council (ISC): The ISC encompasses various international scientific unions and associations, each representing specific disciplines. en.wikipedia.org
- American Association for the Advancement of Science (AAAS): The AAAS organizes scientific disciplines into 24 sections. en.wikipedia.org
- Joint Academic Coding System (JACS): Previously used in the United Kingdom by the Higher Education Statistics Agency (HESA) and the Universities and Colleges Admissions Service (UCAS), JACS classified academic subjects into broad categories. en.wikipedia.org

Methodology

A systematic approach (sometimes a workflow) to investigating phenomena, acquiring knowledge, and testing hypotheses through observation, experimentation, and analysis. It follows structured steps, including problem identification, hypothesis formulation, data collection, experimentation, and conclusion drawing, ensuring objectivity and reproducibility in scientific research.

measured Parameters Quantifiable physical, chemical, or biological variables observed and recorded in scientific research to describe phenomena, test hypotheses, and ensure reproducibility. Examples include temperature, pressure, pH, concentration, velocity, and radiation levels, depending on the scientific discipline.

measured attribute A specific characteristic or property of a measured parameter that provides additional descriptive or qualitative information. Examples include unit of measurement (e.g., Celsius for temperature), accuracy, precision, detection limit, and measurement method.

measured unit A standardized quantity used to express a measured parameter, ensuring consistency and comparability in scientific research. Examples include meters (m) for length, kilograms (kg) for mass, seconds (s) for time, and pascals (Pa) for pressure, as defined by the International System of Units (SI). measured Object / Medium The physical entity or substance on which scientific measurements are performed to obtain data about its properties, behavior, or composition. Examples include air (for atmospheric studies), wa-ter (for hydrological analysis), soil (for environmental monitoring), or a biological specimen (for laboratory testing). For references, definitions related to measured objects and media can often be found in ISO 19156:2011 (Geographic Information – Observations and Measurements, https://cdn.standards.iteh.ai/samples/82463/9dbb951fe5f44d95ab95b7f005d86a75/ISO-19156-2023.pdf) and OGC Observations and Measurements (O&M) standards (http://www.opengis.net/doc/as/om/3.0). Scientific Instruments A device or tool designed to observe, measure, or analyze physical, chemical, or biological phe-nomena with precision and accuracy. Examples include microscopes (for magnification), spectrom-eters (for chemical analysis), and

seismometers (for earthquake detection). For references, definitions can be found in ISO 80000 (Quantities and Units) and ISO 17025 (Gen-eral Requirements for Testing and Calibration Laboratories), as well as in OGC SensorML (Sensor Model Language, https://www.ogc.org/publications/standard/sensorml/) standards. Example: Thermometer, Mass Spectrometer

sampleID SampleID: A unique identifier assigned to a physical sample to ensure traceability and interoperability in scientific research. An example is the International Geo Sample Number (IGSN), a globally unique identifier used to register and link geological, environmental, and biological samples across databases. ID to identify and / or locate the physical sample. Example IGSN or institutional ID

Event Event (Earthquake/Tsunami Context): A sudden natural occurrence resulting from geological or oceanographic processes, characterized by a specific time, location, magnitude, and impact. Examples include an earthquake, caused by seismic activity along faults, and a tsunami, triggered by underwater disturbances such as earthquakes or landslides. Event or incident which was measured, or which influenced the measurement. Example: Earthquake, Tsunami

Geographic Feature A natural or human-made object on the Earth's surface that can be represented spatially, such as mountains, rivers, buildings, or roads. These features can be described by their location, shape, and attributes in geographic information systems (GIS). Geographic feature describing, where a sample was taken, or where an event occured. Example: volcano, valley, sea floor, mid ocean ridge

Material & Sample Type Material: A substance or mixture of substances with specific physical, chemical, or biological properties, used or studied in scientific research (e.g., water, rock, metal, or biological tissue). Sample Type: A specific subset or representation of a material collected for analysis, testing, or experimentation, often categorized by origin, state, or intended study (e.g., soil core, plant root, or marine sediment). For references, definitions related to materials and sample types can be found in ISO 11074 (Soil Quality – Vocabulary), ISO 15189 (Medical Laboratories – Requirements for Quality and Competence), and IGSN (International Geo Sample Number) standards.

Data & Format Data Format: A structured way of encoding and organizing data for storage, processing, and exchange, ensuring interoperability and readability by software systems. Examples include CSV (Comma-Separated Values), JSON (JavaScript Object Notation), XML (Extensible Markup Language), and NetCDF (Network Common Data Form). For references, definitions related to data formats can be found in ISO 19118 (Geographic Information – Encoding), ISO/IEC 2382 (Information Technology – Vocabulary), and OGC Standards (e.g., GeoJSON, GML, and WMS formats).

Process & Phenomena Process: A series of actions, reactions, or changes occurring in a system over time, leading to a specific outcome (e.g., sediment transport in rivers, photosynthesis in plants, or volcanic eruptions). Phenomena: Observable events or occurrences in nature or science that can be studied and measured, often resulting from physical, chemical, or biological processes (e.g., earthquakes, climate change, or electromagnetic waves). For references, definitions related to data formats can be found in ISO 19118 (Geographic Information – Encoding), ISO/IEC 2382 (Information Technology – Vocabulary), and OGC Standards (e.g., GeoJSON, GML, and WMS formats).

Human Impact & Land Use Human Impact: The effect of human activities on the environment, ecosystems, and natural resources, including deforestation, pollution, urbanization, and climate change. Land Use: The way land is utilized and managed by humans for specific purposes, such as agriculture, urban development, forestry, conservation, and industry. For references, definitions can be found in ISO 19144-2 (Geographic Information – Classification Systems – Part 2: Land Cover Meta-

Language), FAO Land Use Classification standards, and IPCC (Intergovernmental Panel on Climate Change) reports on human impact on ecosystems.

Software Software: A set of instructions, programs, and data that enable a computer or system to perform specific tasks, including operating systems, applications, and utilities. It can be categorized into system software (e.g., Windows, Linux), application software (e.g., GIS tools, word processors), and middleware (e.g., API frameworks). ISO/IEC/IEEE 24765:2010(en) Systems and software engineering — Vocabulary: https://www.iso.org/obp/ui/#iso:std:iso-iec-ieee:24765:ed-1:v1:en

Date/Time Date/Time: A standardized representation of a specific point or duration in time, typically expressed in formats such as YYYY-MM-DD (date) or HH:MM:SS (time), often linked to time zones and reference systems like UTC (Coordinated Universal Time). Reference: ISO 8601:2019. https://www.iso.org/standard/70907.html

Epoch Epoch (Geological/Historical Context): A division of geological or historical time characterized by significant events, environmental conditions, or cultural developments. In geology, an epoch is a subdivision of a period (e.g., Holocene Epoch of the Quaternary Period), while in history, it marks a distinct era (e.g., Bronze Age or Renaissance). Reference: International Commission on Stratigraphy (ICS) - Geologic Time Scale: “An epoch is a unit of geological time that is shorter than a period and longer than an age, defined by significant changes in Earth's history.”

Species The scientific designation of a species, composed of a binomial nomenclature (genus + specific epithet), following taxonomic classification rules (e.g., Homo sapiens for humans). Reference: According to International Code of Zoological Nomenclature (ICZN) & International Code of Nomenclature for algae, fungi, and plants (ICN).

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