6TH ASIA-OCEANIA GROUP ON EARTH OBSERVATIONS (AOGEO) WORKSHOP

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Protocols and platform development for long-term monitoring of typical terrestrial ecosystem in China and Central Asia

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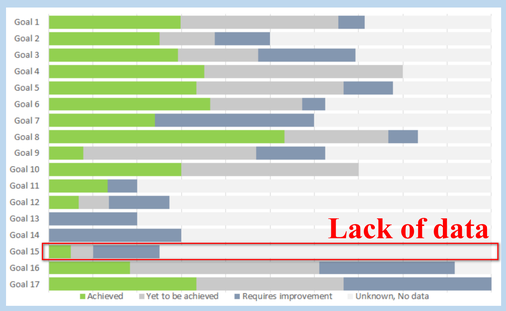
Background and Objective

"Mainstreaming, Acceleration and Policy Support (MAPS) for Achieving SDGs in Central Asia countries" programme led by the World Bank shows that data for Central Asia cannot effectively support the needs of ecosystem service assessment and SDG15.

- Poor standardization and comparability of existing data
- Lack of ecological data repository
- Lack of standardized data products



source:Contribution to Kazakhstan's Roadmap to Attain the SDGs

One of solution for this problem is to develop in situ monitoring and data sharing protocols of typical terrestrial ecosystems in Central Asia.

Methodology

Focused on ecosystem service assessment for SDG15 and based on works of CERN, CNERN, and CAERN, we've developed sets of technical protocols about long-term observation, quality control, and data producing for typical terrestrial ecosystem in China and Central Asia. Then under these protocols we attempt to develop and establish data management information system to enhance multi-sources ecosystem monitoring data aggregation, management, and processing for field site.

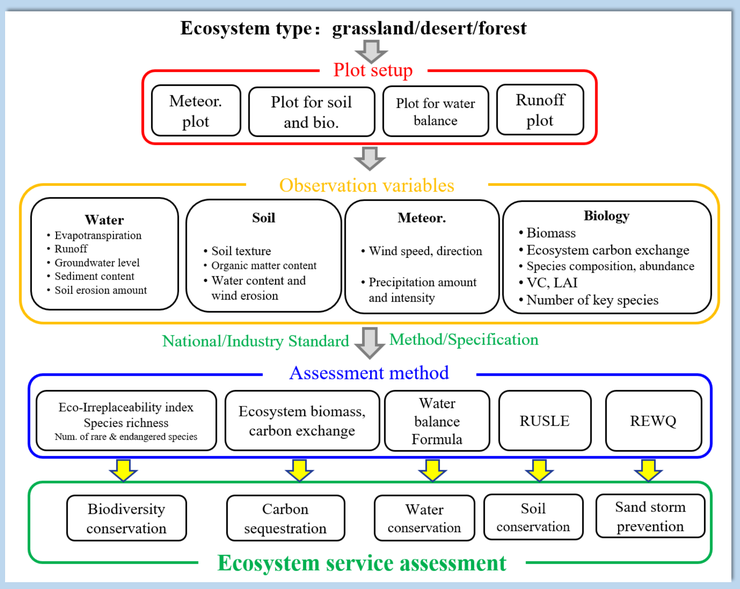
Distribution of ecological sites in research region

- *Agriculture: 6*
- *Forest: 6*
- *Grassland: 6*
- *Desert: 9*

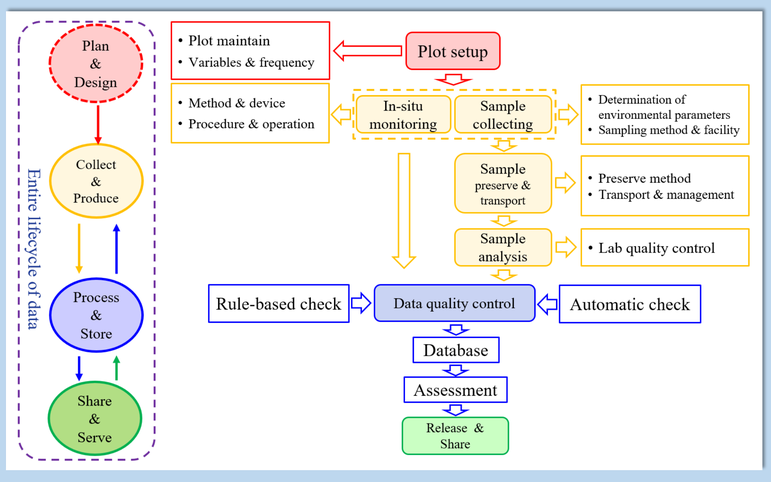
15 in China, 12 in Central Asia

Protocols for long-term observation, quality control, and data product

- Protocol for long-term observation in grassland, desert, and forest ecosystems, including plot setup, observation variables and methods, assessment methods for ecosystem services.



- Protocol for quality control through entire lifecycle of monitoring data, including plot setup, in situ monitoring, sample collection, lab analysis, data quality assessment, and etc. The front-end and back-end quality control measures have been integrated.



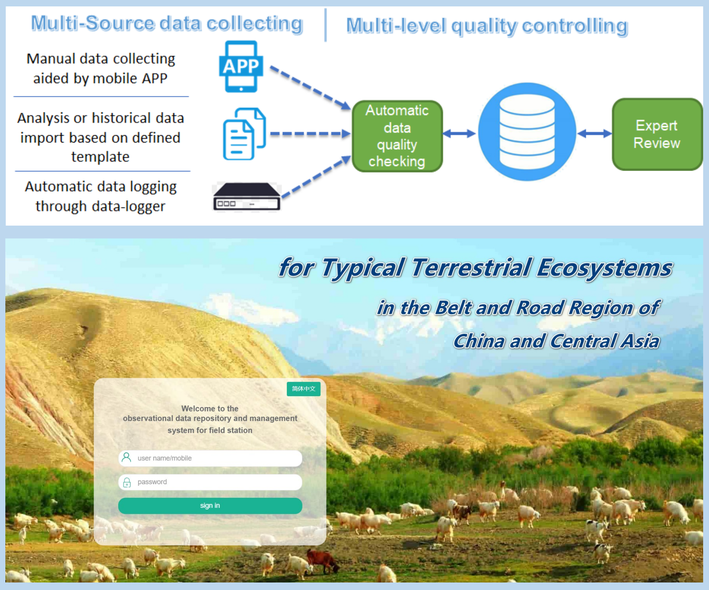
- Protocol for data product development of long-term ecosystem monitoring.
  - ✓ Propose to build monitoring data product system via dimensions of classification and gradation;

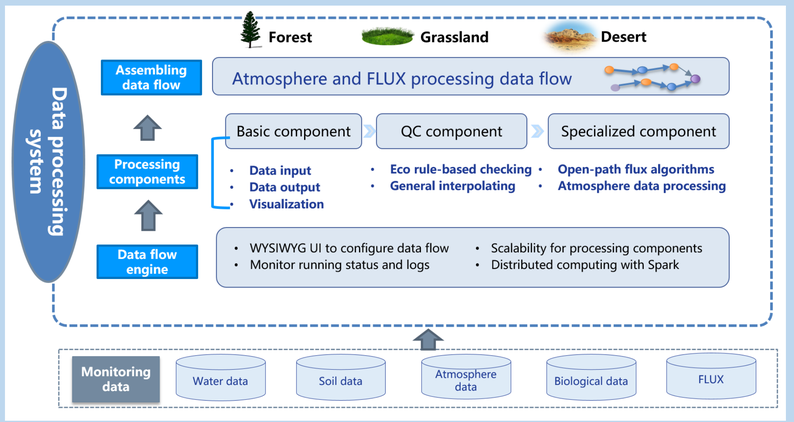
Classification			Gradation
Primary Class	Secondary Class	Minor Class	L0 ↓ L4: According to processing degrees
Ecosystem element observation data products	Water, soil, atmosphere & biology	According to observation item	
Ecosystem services data products	Support open classification		

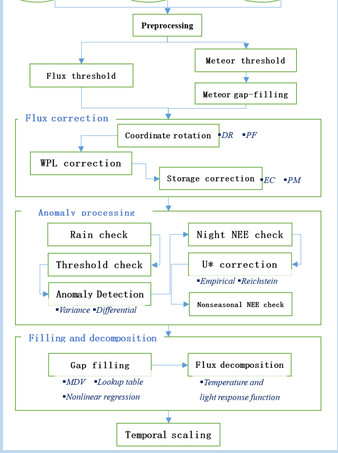
  - ✓ Develop process and quality control methods for ecosystem element observation data products, including water, soil, atmosphere and biology;
  - ✓ Develop processing and quality control methods for key ecosystem service data products.

Data management and processing information system for field site

- Develop a B/S-based data management system for field site , which enables observation data collection, transmission, and management from different sources. It supports rule-based automatic validation and manual auditing. Now cooperating with CAEORN for testing.







- Based on the big data flow engine *PiFlow*, we integrate specialized algorithms into a new system to realize customizable processing flow for meteorological data (from *Vaisala* one-hour logger data to day, month and year) and open-path flux data (from half-hour eddy covariance to day, month, year).

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Knowledge hub for Central Asia regional ecosystem monitoring, access http://www.ccarema.org for more details. National Ecosystem Data Bank(EcoDB, https://ecodb.scidb.cn) established as a FAIR data repository for global ecological researchers will support special issue of Chinese Science Data entitled "Key data for the functional assessment of typical terrestrial ecosystems in the arid zone of Central Asia" (to be published by the end of 2023).