



# Introduction to ARIES



ARIES refers to the **Artificial Intelligence for the Environment & Sustainability** made by a group of researchers from the [BC3](#).

ARIES is developed through a platform enabling to **store, model and disseminate** Governments- endorsed environmental data on ecosystems extent, conditions, services and assets.

The use of **semantics** to properly detail the information of data and the **machine reasoning** facilitate the access, comparison and synthesis of a wide range of resources matching the user's query.

There are three groups of agents underlying ARIES creation (\*): **data providers** (send the data in the standard format and protocol agreed), **modelers** (document the data received and apply statistical methods to ease their interoperability) and **users**, from common citizens to National Statistical Offices and other institutions (endorse and maintain interoperable data in the long term).

(\*) In ARIES, the corresponding Credit is recognized for each contributing institution.

<https://aries.integratedmodelling.org/>

# ARIES: Artificial Intelligence for Environment & Sustainability

# 1

It is a **modelling technology**, rather than a single model, collection of models or specific program/application;

# 2

It is an **AI modeller**, based on **machine reasoning**, a less known branch of AI;

# 3

It defines a variety of data, models and the relationships between them using **consistent and uniform terms**. This allows different data and models to be used together, depending on which data and models are “most appropriate” for the context set by the user;

# 4

It uses AI to determine the “**most appropriate**” data and models for users’ requests.

Reasoning  
algorithms

+

Decision  
rules

+

Multidisciplinary  
semantics

+

Open data  
& models

+

Open- source  
software

=

ARIES: Fast, FAIR  
multidisciplinary  
modeling

## What can ARIES be used for?



Spatial  
economic  
valuation of  
ecosystem  
services



Conservation  
planning



Spatial policy  
planning



Forecasting  
changes in  
ecosystem  
service  
provisioning



Natural  
capital  
accounting

## Why artificial intelligence (AI)?

Governments often face **high barriers** to entry in producing ecosystem accounts:

- Ecosystem accounting has **high data needs**;
- Large amounts of data result in **long processing times**, making compilation a slow exercise;
- Ecosystem accounting often makes use of **biophysical models** which require technical expertise.

Ecosystem accounting would **benefit** from data and models which are **Findable, Accessible, Interoperable and Reusable** (FAIR).



F<sub>indable</sub>



A<sub>ccessible</sub>



I<sub>nteroperable</sub>



R<sub>eusable</sub>



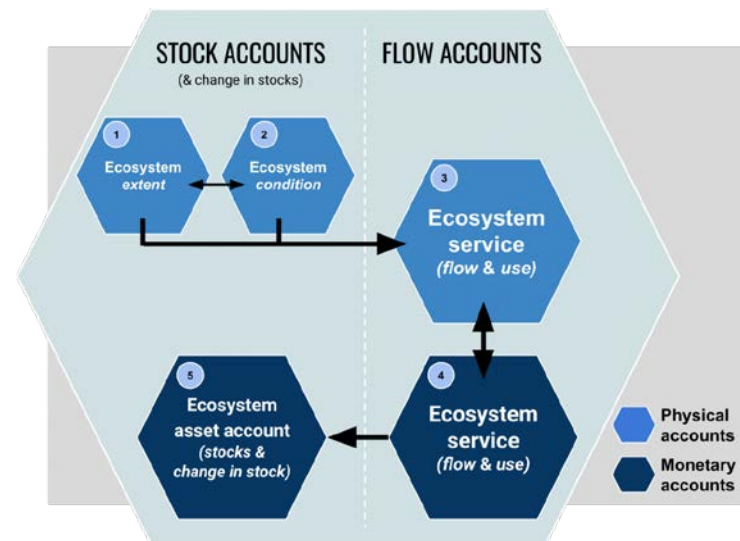
# Introduction to ARIES for SEEA

# What is the ARIES for SEEA Explorer?

- # 1 A tool that uses the ARIES technology to compile ecosystem accounts that are consistent with the **SEEA Ecosystem Accounting**;
- # 2 It utilizes remote- sensing **data and models** where governments- endorsed data are not available;
- # 3 It can generate accounts for **any** user- specified **terrestrial area** in the world;
- # 4 It **rapidly** computes these accounts online, using a web browser;
- # 5 It generates a comprehensive **report, fully documenting the data, models, coefficients and methods** used.



## System of Environmental Economic Accounting



# What are the ARIES for SEEA Explorer's outputs?

# 1 A combination of statistical and spatial analysis summarized in **Tables(1)** and **Maps(2)**.

Table 1. Ecosystem extent account - net balance

**Table 1. Occurring ecosystem types (selected level 3 Ecosystem Functional Groups of the IUCN Global Ecosystem Typology 2.0)**

	Coastal saltmarsh reedbed	Cropland	Urban industrial ecosystem	Polar tundra desert	Polar alpine rocky outcrop	Alpine grassland shrubland	Ice sheet glacier permanent snows
Extent at start of 2012 (km <sup>2</sup> )	1987.60	747162.95	3849.41	125.80	2742.39	24330.55	1232.82
Extent at start of 2019 (km <sup>2</sup> )	2037.92	771970.26	4729.99	125.80	2817.87	24354.44	1232.82
Net change	50.32	24807.31	880.58	0.00	75.48	-176.12	0.00

Figure 1. Ecosystem type



# What are the ARIES for SEEA Explorer's outputs?

# 2 Full transparency for replicability and traceability through Reports(1), a Resource Section(2) & a Datflow Diagram(3).

**1. Introduction**

**Disclaimer**

The organizations employed and the presentation of material on this map and any map used in this application do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This application allows users to select different backgrounds as a map. The user also chooses (https://www.openstreetmap.org/help/en) as the official (as shown) map, other backgrounds such as Open Street Map are available for exploration presented in this report are based on the content of

**SEEA-EEA**

The system of Environmental-Economic Accounting - Ekte values of services provided by ecosystems changes over time and the value of the services they produce in the

The U.N., in collaboration with the ARIES team, has developed mapping and valuation for various accounts including eco-accounts compiled for any region on Earth using global data, with local

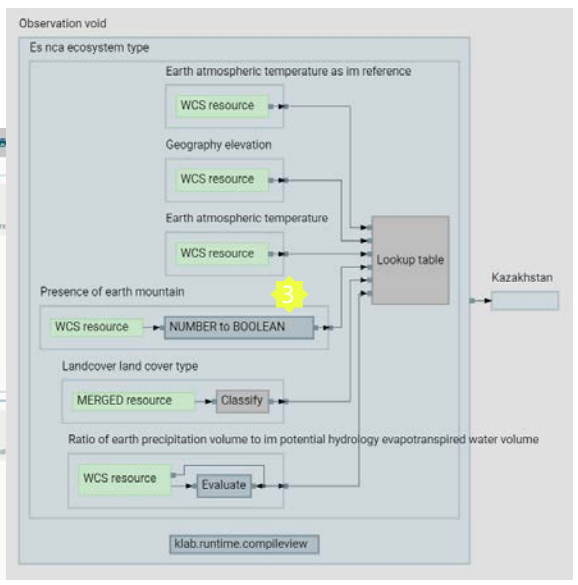
**1.1. Ecosystem Extent**

The Ecosystem Extent Account is the first SEEA EA<sup>1</sup> account used in all other accounts, so are fundamental to SEEA-EEA. Ecosystems are defined as units whose functioning is gone (ecosystems in this context should not be confused with habitats). IUCN's Global Ecosystem Typology is the standard for ecosystem applications relied exclusively on land cover data<sup>2</sup>.

A full ecosystem extent account includes gross changes (of the same ecosystem type and for each accounting period), changes for agricultural lands, natural expansion/retreat (adjustments to initial estimates resulting from improved ecosystem services in the formulation of the SEEA EA, Final

**Global Mountain Explorer (GME)**  
USGS

This resource was developed by the U.S. Geological Survey (USGS) in partnership with the Center for Development and Environment of the University of Bern (CDE), the Global Mountain Biodiversity Assessment (GMBAs), and the Mountain Research Initiative (MRI). The work is part of a Group on Earth Observations (GEO) initiative called GEO GLOBE (GEO's Global Network for Observations and Information in Mountain Environments). The GME resource was developed using a 1-km spatial resolution (20° by 20° grid) and Neotoma-based extraction algorithms with variable buffer sizes used to extract a set of global mountain footprints with 13 uniform types of uniform four were mountain classes. Each footprint was a polygon of landform mapping and described three parameters for distinguishing different types of peaks, hills, mountains, and plateaus. The three classification parameters are slope, relative relief, and profile, where the profile parameter assesses the amount of relief that terrain in upland locations to denote topography. The 250 m global mountain footprints product was based on an automated extraction of classes in a GIS environment, and the GME mountain product was an export of the four mountain classes into a global mountains database.



## Two type of users:

### Non-technical users

Users who want to create evaluations and explore defined scenarios.

Only a current web browser is needed, such as Chrome or Firefox to use the online tool called **k.Explorer** (the general k.LAB interface to explore by querying the knowledge base) to access k.LAB's linked data and models.

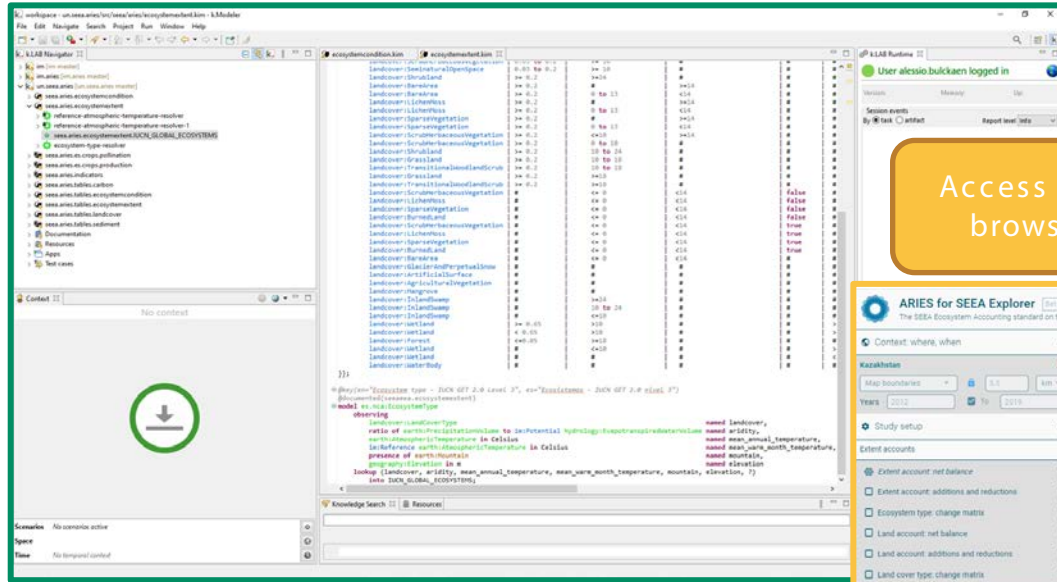
### Technical users

Users who want to produce data and model.

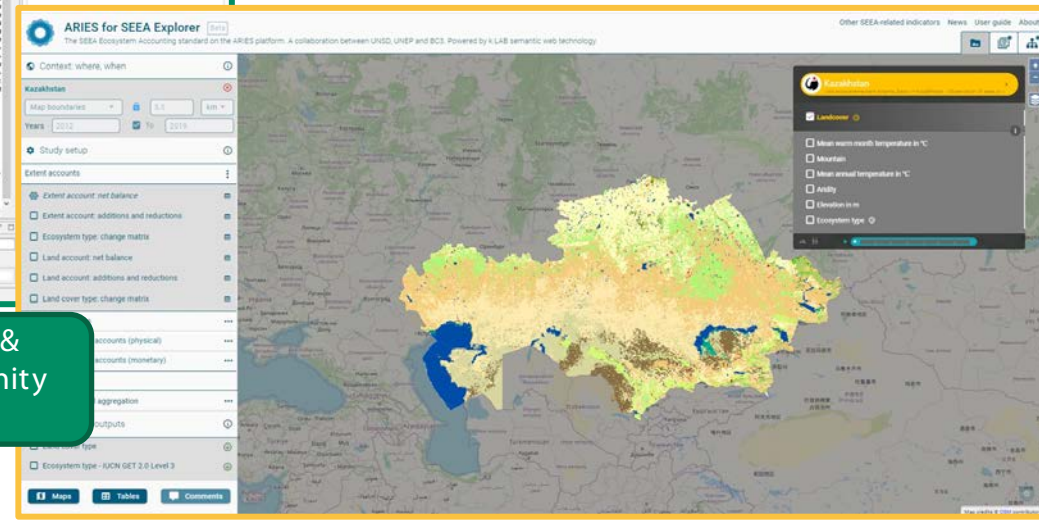
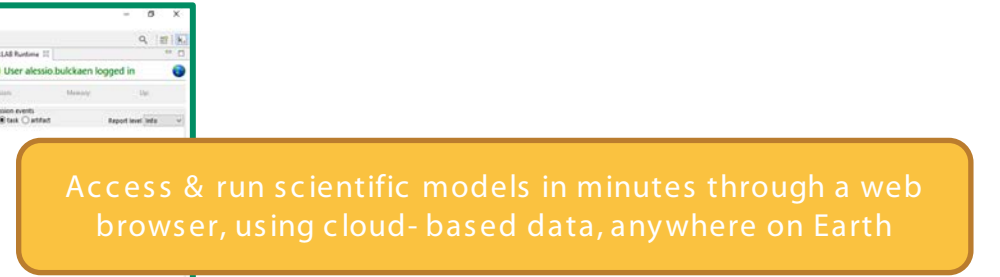
You'll need specialized tools to import, annotate, and publish data and models on the k.LAB semantic web. You have to install the Control Center software package which includes:

- The local engine (**k.LAB engine**) and its web-based user interface (**k.Explorer**)
- The Integrated development environment (**k.Modeler**)

# Interfaces for technical and non-technical users



Contribute & semantically annotate new data & model resources for reuse by scientific community & public



## Access the application

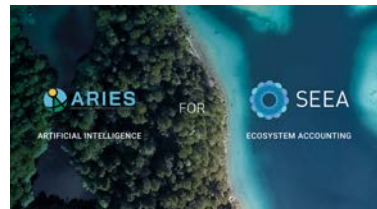
1. The first step is to **register** in the Integrated Modelling hub
2. Once created a profile, **access the link** to launch the application from your browser (or download the Control Center – the software for modelers, and install it on your engine)
3. Use the intuitive user-interface to **compile account(s) everywhere on earth**

## Useful links to explore

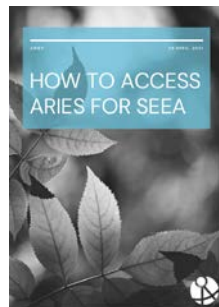
1. [ARIES for SEEA explorer](#)
2. [Registration in the IM hub](#)
3. [Technical note](#)
4. [YouTube channel](#)
5. Write us for support at [support@integratedmodelling.org](mailto:support@integratedmodelling.org) or for if you're interested to join our modelling journey at [aries@integratedmodelling.org](mailto:aries@integratedmodelling.org)



# Demonstration of the ARIES for SEEA Explorer



Webpage



Access guide



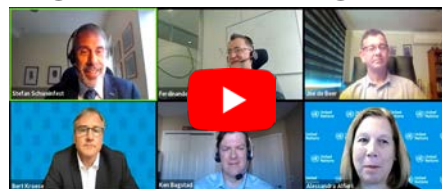
User guide



Factsheet



Demonstration & Q&A session for the EU Green Week 2021



ARIES for SEEA launch



ARIES technology