ARIES for SEEA Explorer

Artificial Intelligence for SEEA Ecosystem Accounting

United Nations Statistics Division
Why artificial intelligence?

- 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)
Artificial Intelligence for Environment & Sustainability (ARIES)

• What is ARIES?
  • ARIES is a modelling technology, rather than a single model, collection of models or specific program/application
  • It is an artificial intelligent modeler

  ![Diagram of ARIES components: Reasoning algorithms + Decision rules + Multidisciplinary semantics + Open data & models + Open-source software = ARIES: Fast, FAIR multidisciplinary modeling]

• 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 your context

• ARIES technology uses artificial intelligence to determine the “most appropriate” data and model for your request
Artificial Intelligence for Environment & Sustainability (ARIES)

• What can ARIES be used for?
  • Spatial mapping and quantification of ecosystem services
  • Spatial economic valuation of ecosystem services
  • Conservation planning
  • Spatial policy planning
  • Forecasting changes in ecosystem service provisioning
  • Natural capital accounting
What is ARIES for SEEA?

- Tool that uses ARIES technology to compile ecosystem accounts that are consistent with the SEEA Ecosystem Accounting
- Includes land cover accounts consistent with the SEEA Central Framework
- Uses same definitions, classifications, accounting rules as the SEEA
- Can help automate production of maps and tables
- Provides infrastructure for the SEEA community to share and reuse interoperable data and models
What is ARIES for SEEA?

- Utilizes freely available global remote-sensing derived data and models
- Can generate accounts for any user-specified terrestrial area in the world
- Rapidly computes these accounts online, using a web browser
- Generates a comprehensive report, fully documenting the data, models, coefficients and methods used

<table>
<thead>
<tr>
<th>Table 1. Occurring ecosystem types (selected level 3 Ecosystem Functional Groups of the IUCN Global Ecosystem Typology 2.0)</th>
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<tbody>
<tr>
<td>Ecosystem type</td>
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<tr>
<td>Extent at start of 2012 (sq km)</td>
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<tr>
<td>Extent at start of 2014 (sq km)</td>
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<td>Net change</td>
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<tr>
<td>Ecosystem type</td>
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<td>Opening extent (at start of 2012)</td>
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<td>Additions to extent</td>
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<tr>
<td>Net change (extant)</td>
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<td>Closing extent (at start of 2014)</td>
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Interfaces for technical and non-technical users

Access & run scientific models in minutes through a web browser, using cloud-based data, anywhere on Earth

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

• Helpful links:
  • Webpage: https://seea.un.org/content/aries-for-seea
  • User guide: https://aries.integratedmodelling.org/aries-for-seea-user-guide/ (browser) or https://aries.integratedmodelling.org/aries-for-seea-documentation/ (phone/tablet)
  • Demonstration and Q&A session for EU Green Week 2021: https://aries.integratedmodelling.org/aries-for-seea-explorer-the-first-ai-tool-for-rapid-natural-capital-accounting/
  • ARIES for SEEA launch: https://youtu.be/HLy3nVNWprc
  • ARIES technology: https://aries.integratedmodelling.org/
Next steps for ARIES for SEEA

• Virtual regional workshops
• Improvements to interface and models, including ability to upload custom data in the web explorer
• Expand to more ecosystem types, especially freshwater/marine
• Expand to additional ecosystem condition metrics
• Adding more models (nature-based tourism, water provisioning)
Next steps for ARIES for SEEA

• Given linked data and models, ARIES can report nearly any SEEA-relevant SDG or post-2020 Global Biodiversity Framework indicator

• Potential for custom SDG/Post-2020 application

• Potential indicators:
  • Change in the extent of ecosystems
  • Forest fragmentation index
  • Level of erosion
  • Total climate regulation services provided by ecosystems
  • Mountain Green Cover Index
  • Proportion of biodiversity hotspots covered by protected areas (pending data availability)
  • Value of (selected) final ecosystem services (GEP)
THANK YOU

seea@un.org // https://seea.un.org/