Ozone assessment as an EOSC-Synergy thematic service

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Ozone assessment is an important task for Climate and Environment studies. The ozone assessment service (O3as) project is going to support scientists and everyone interested in determining ozone trends for different parts of the world. It is one of the thematic services of the EOSC-Synergy project. The service applies a unified approach to analyse results from a large number of different chemistry-climate models, helps to harmonise the calculation of ozone trends efficiently and consistently, and produces publication-quality figures in a coherent and user-friendly way. Among other tasks it will aid scientists to prepare the quadrennial Global Assessment of Ozone depletion. It will also allow access to the high-level data by citizens. The service relies on several containerized components distributed across the cloud (Kubernetes) and HPC resources and leverages Large scale data facility (LSDF).

### O3as: Ozone assessment

**Motivation:** Monitoring and projecting stratospheric ozone is mandated by UN Environment to safeguard a healthy planet. Regularly many climate models project future climate and ozone change, producing huge amounts of data that have to be analysed for key metrics. Those key metrics help policy makers to judge if measures implemented to protect the stratospheric ozone layer are working.

**O3as: ozone assessment for everyone**

**Problem:**
- A typical workflow of today has many manual steps
- Full processing from raw data takes hours
- The code is not always accessible or well maintained

**O3as solution:**
- Climate Models data (10’s TB) are collected in one place
- The data are reduced to the parameters of interest and homogenized at HPC [o3skim]
- The reduced data (100’s MB) can be accessed with REST API in seconds [o3api]
- A user may do final processing and plotting by leveraging the WebApp [o3webapp]

⇒ Basically everyone can access Ozone models data

**O3as** consists of 3 main components:
- **o3webapp**: leverages React and bokeh
- **o3api**: is based on OpenAPI/Swagger and Flask
- **o3skim**: uses parallel computing (xarray, MPI) at HPC

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### O3as project goals:

To provide a framework to efficiently explore ozone projections, including the calculation of key metrics:

- Improve the existing workflow and provide a reliable tool for scientists to perform analysis in a more efficient manner
- Ensure reproducibility of results
- Simplify data access and the use
- Publish high-level data to citizens

⇒ Plots are not easy to rebuild for various inputs
⇒ Possible inconsistency in results
⇒ No-way to assess the results by non-specialists

### Timeline and milestones:

- Inventory of the current workflow and collection of requirements (7.2020)
- Prototype solution (12.2020)
- Access to >100 climate models via API (4.2021)
- First release leveraging EOSC-Synergy solutions (7.2021)
- Publishing at EOSC marketplace (8.2021)
- Feedback evaluated, service is in full production (1.2022)

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### Thematic services

In Astrophysics, Biomedicine, Earth Observation, Environment:

- WORSICA
- SDS-WAS
- OpenEBench
- O3AS
- UMSA
- SAPS-SEB
- SCIPION
- G-CORE
- MSWSS
- LAGO

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**AAI**

Modern AAI solutions based on OIDC, e.g. EGI Check-in, oidc-agent, and the research on OIDC-based authentication for SSH

**SQAaaS**

- Automated validation process to assess the quality of the services and data repositories.
- Verifiable digital certifications to both software and services.
- Assessing data FAIRNESS and ‘FAIR enabling’ data repository features.

**Training**

Learn platform for training courses on open science and using services from EOSC

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**Resources**

Dashboards of either Infrastructure manager or Openstack can be used to deploy resources

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**8 EU countries**: Spain, Portugal, UK, Czech Republic, Germany, Slovakia, Poland, Netherlands

**Project time**: 9.2019 – 10.2022

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EOC-synergy receives funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 857647