Ozone assessment service (O3as) in action

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EOSC Synergy in a nutshell

Expand EOSC **capacity** and **capabilities** by leveraging **Investments** and existing **know-how** & **resources** of national digital infrastructures

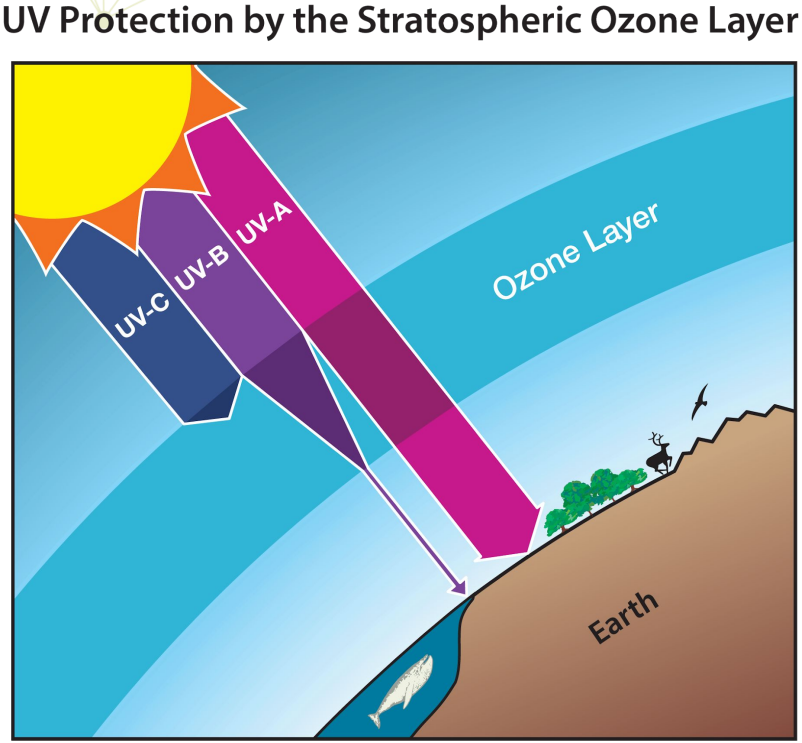
Foster EOSC services **integration** and promote **quality**

Thematic services for Scientific communities in **Astrophysics**, **Biomedicine**, **Earth Observation**, **Environment**

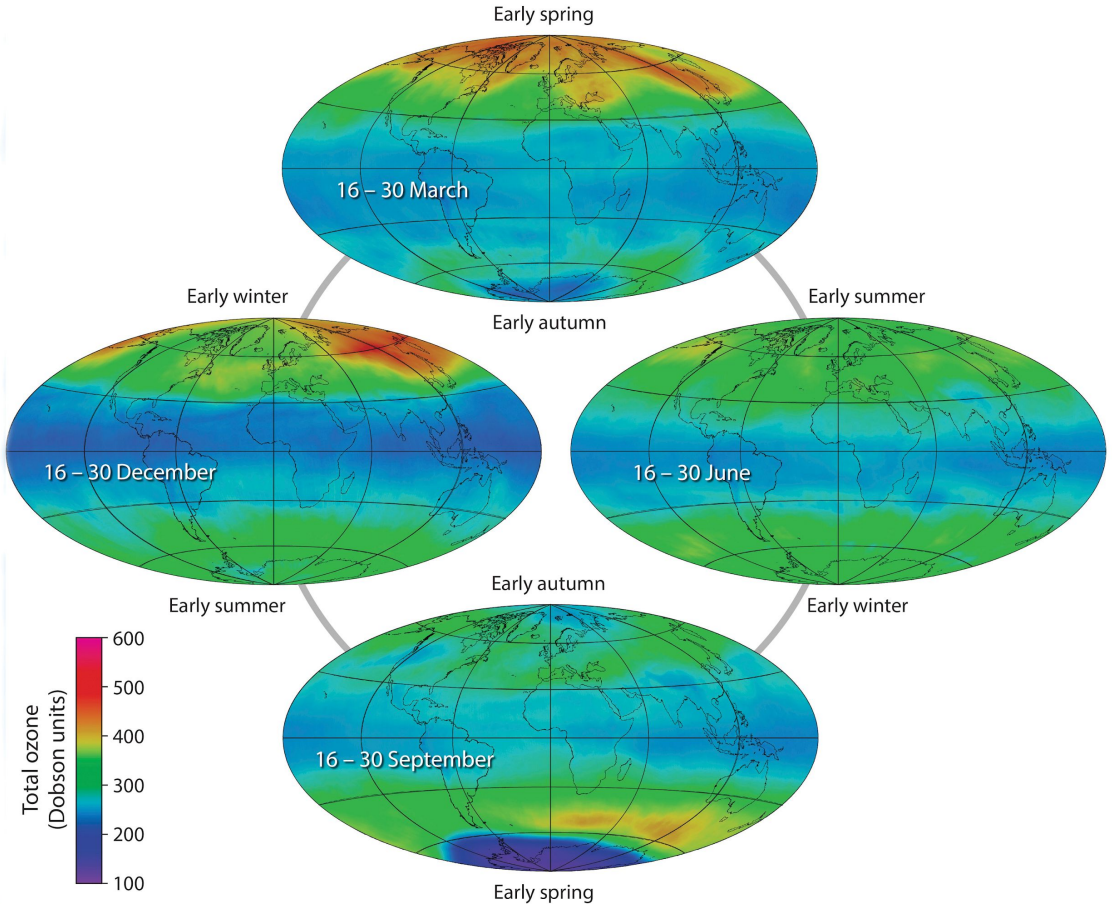
Spain, Portugal, UK, Czech Republic, Germany, Slovakia, Poland, Netherlands

Expected impact is a measurable **increase** in the number of **resources**, **services** and data **repositories** offered to **researchers** through EOSC

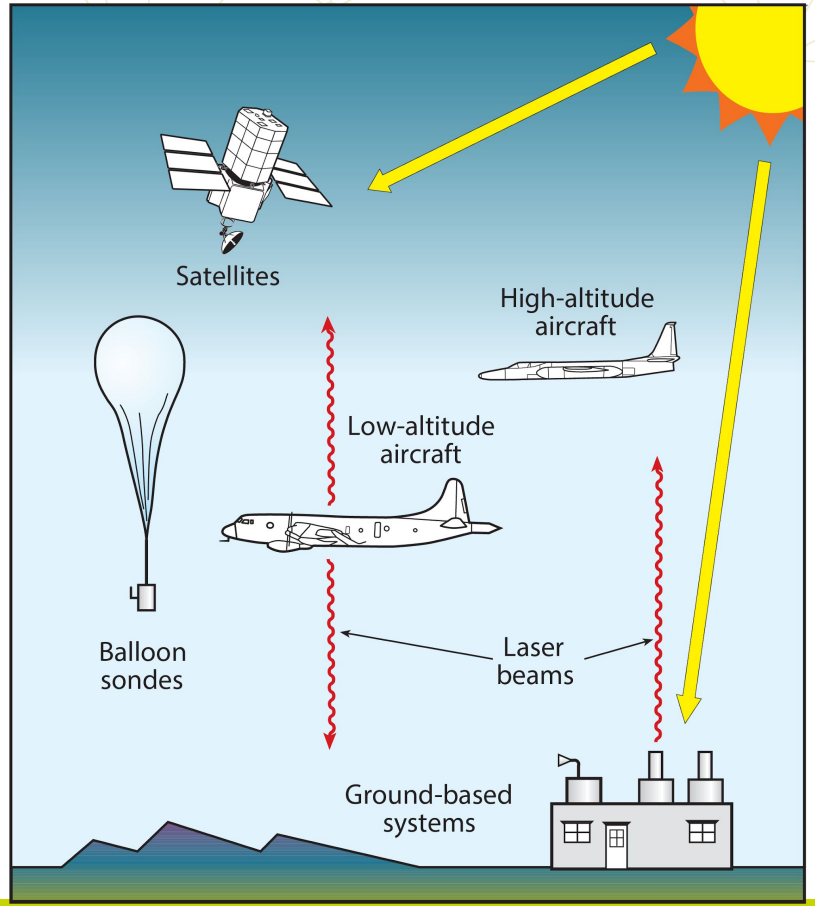
Short Motivation and Background



Global Satellite Maps of Total Ozone in 2009



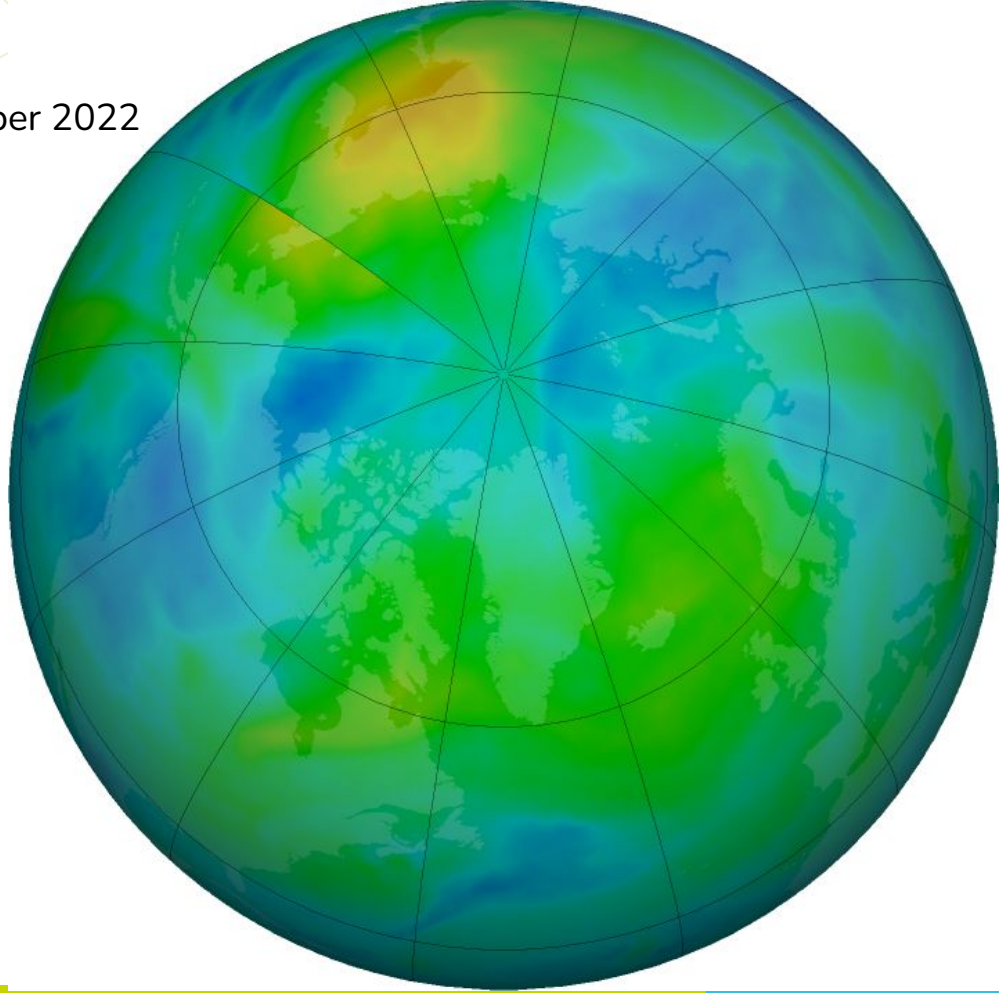
Measuring Ozone in the Atmosphere



Measurements

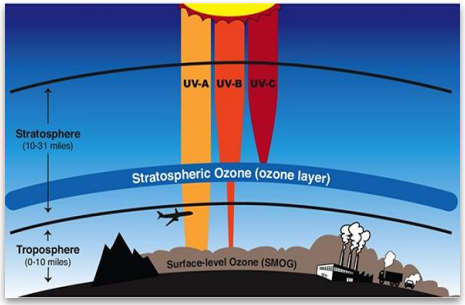
Satellite observations of ozone over the northern hemisphere in the winter 2021/2022.

https://ozonewatch.gsfc.nasa.gov/ozone_maps/movies/OZONE_D2021-11-01%25P1D_G%5e1280X720.IOMPS_PNPP_V21_MMERRA2_LNH.mp4



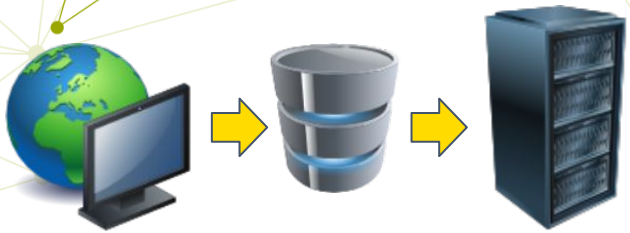
What is Ozone assessment?

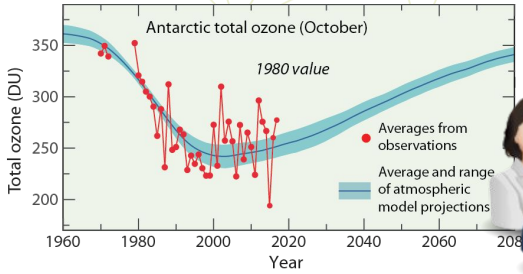
- Ozone is important to protect us from **harmful UV** radiation.
- Ozone assessment reports have been compiled since **1985**. The recent report from 2018 consists of 6 chapters and 5 appendices with about 25 people actively working on each chapter and a multitude working in support.
- Monitoring and projecting stratospheric Ozone is mandated by **UN Environment** to **safeguard a healthy planet**.
- **O3as Aim**: Provide a tool to extract ozone trends from big data and produce figures in publication quality interactively.

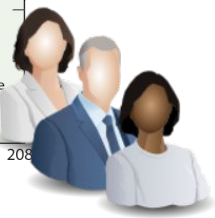


The ozone layer in the stratosphere shields life on Earth from most UV-B and UV-C, the most harmful varieties of ultraviolet radiation. Credit: NASA

Current workflow







The climate model data (TBs) has to be downloaded manually and homogenized for processing

Custom Python scripts are written to produce figures of ozone time series.

Climate scientists present the figures to collaborators in various countries.

BUT:

- The workflow has many **manual** steps
- Full processing from raw data takes **hours**
- The code is **not always publicly accessible** or **well maintained**

⇒ The plot is **not easy to rebuild** with other input parameters

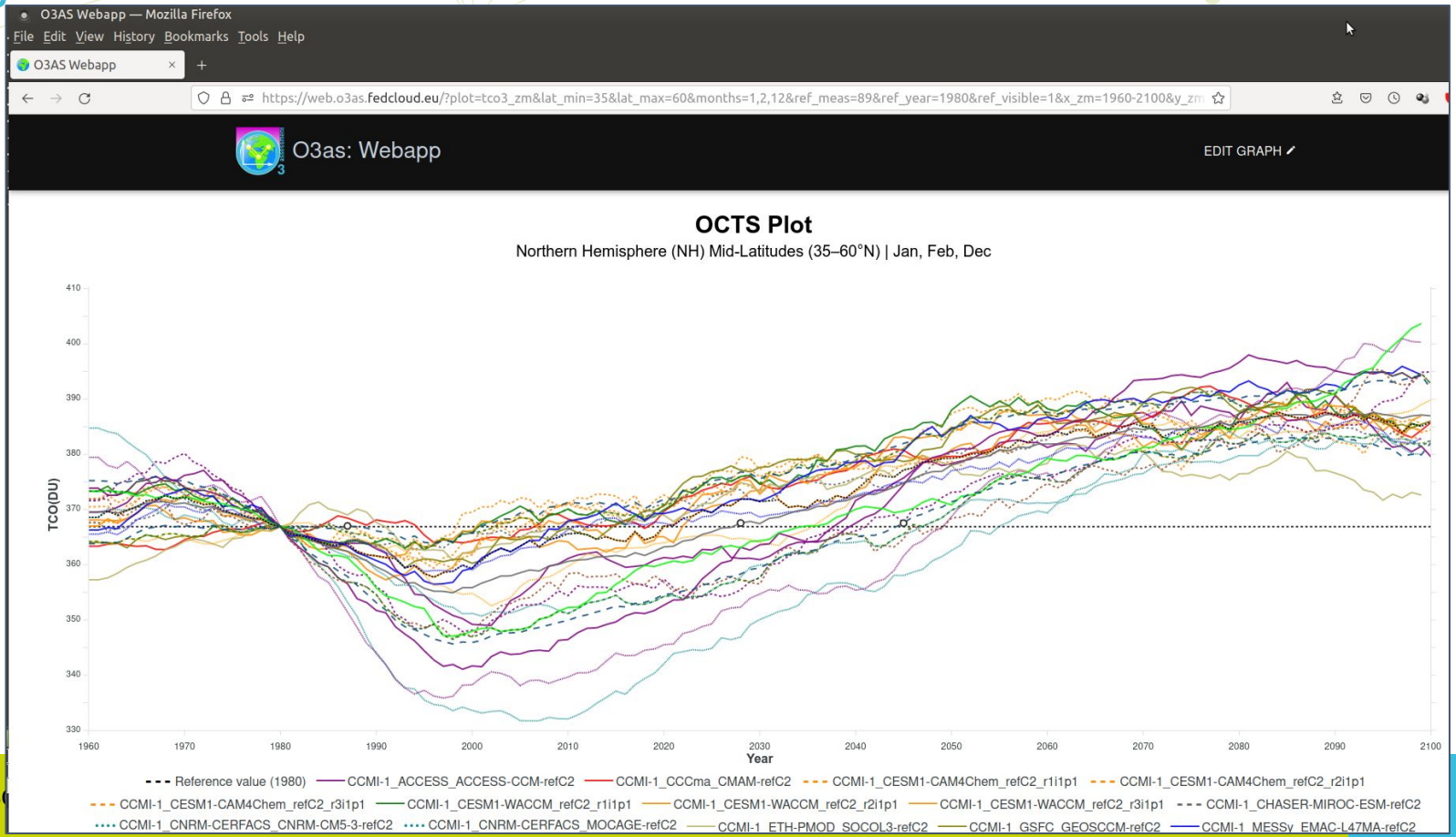
⇒ Possible **inconsistency** in the final results :-(((

⇒ **No-way to assess** the results **by non-specialists**

o3as demo

https://o3as.data.kit.edu/

o3webapp


O3AS Webapp — Mozilla Firefox
File Edit View History Bookmarks Tools Help
O3AS Webapp
https://web.o3as.fedcloud.eu/?plot=tco3_zm&lat_min=35&lat_max=60&months=1,2,12&ref_meas=89&ref_year=1980&ref_visible=1&x_zm=1960-2100&y_zm
O3as: Webapp
EDIT GRAPH
OCTS Plot
Northern Hemisphere (NH) Mid-Latitudes (35–60°N) | Jan, Feb, Dec
TCO(DU)
Year
Reference value (1980)
CCMI-1_ACCESS_ACCESS-CCM-refC2
CCMI-1_CCCma_CMAM-refC2
CCMI-1_CESM1-CAM4Chem_refC2_r1i1p1
CCMI-1_CESM1-CAM4Chem_refC2_r2i1p1
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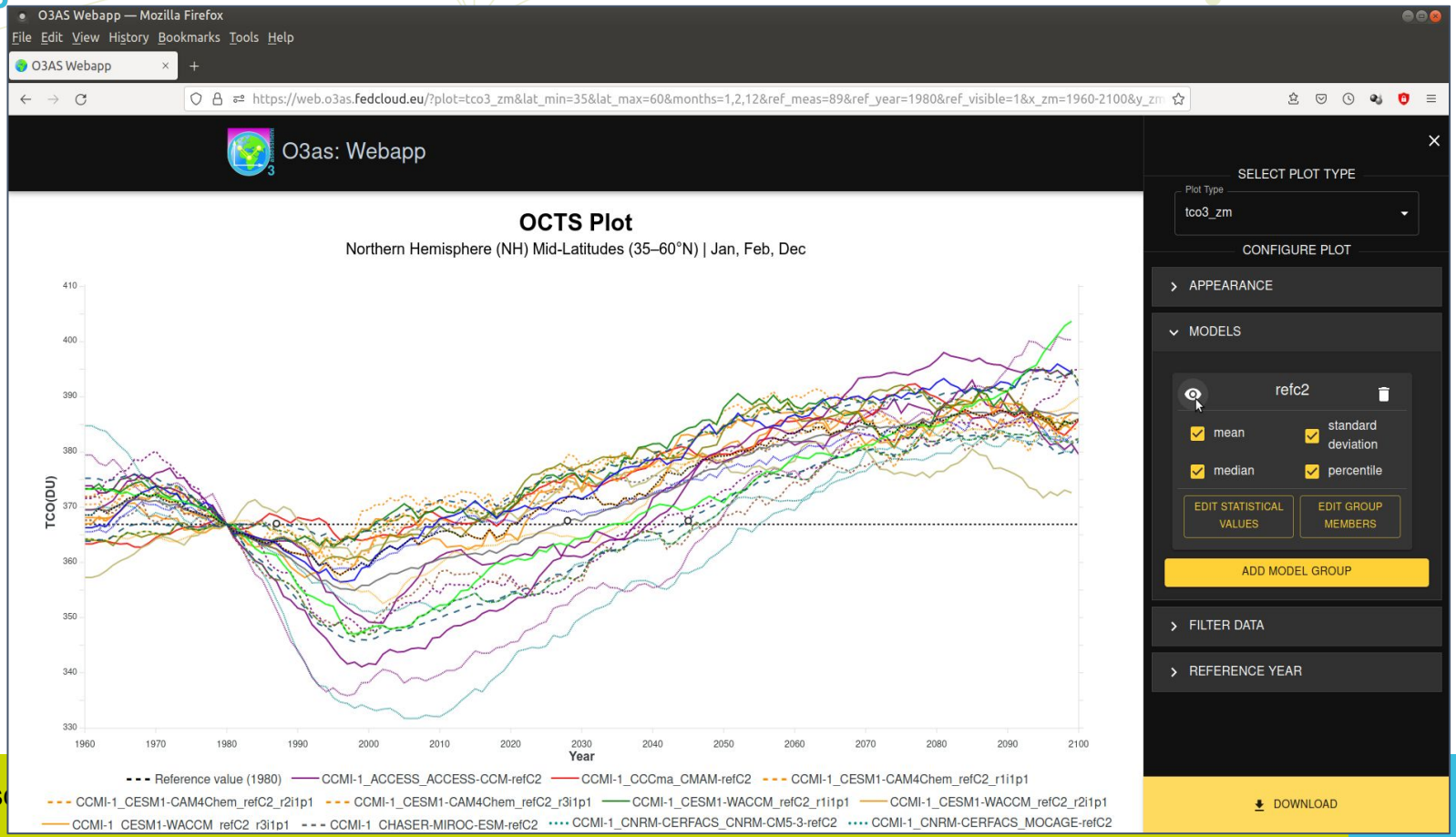
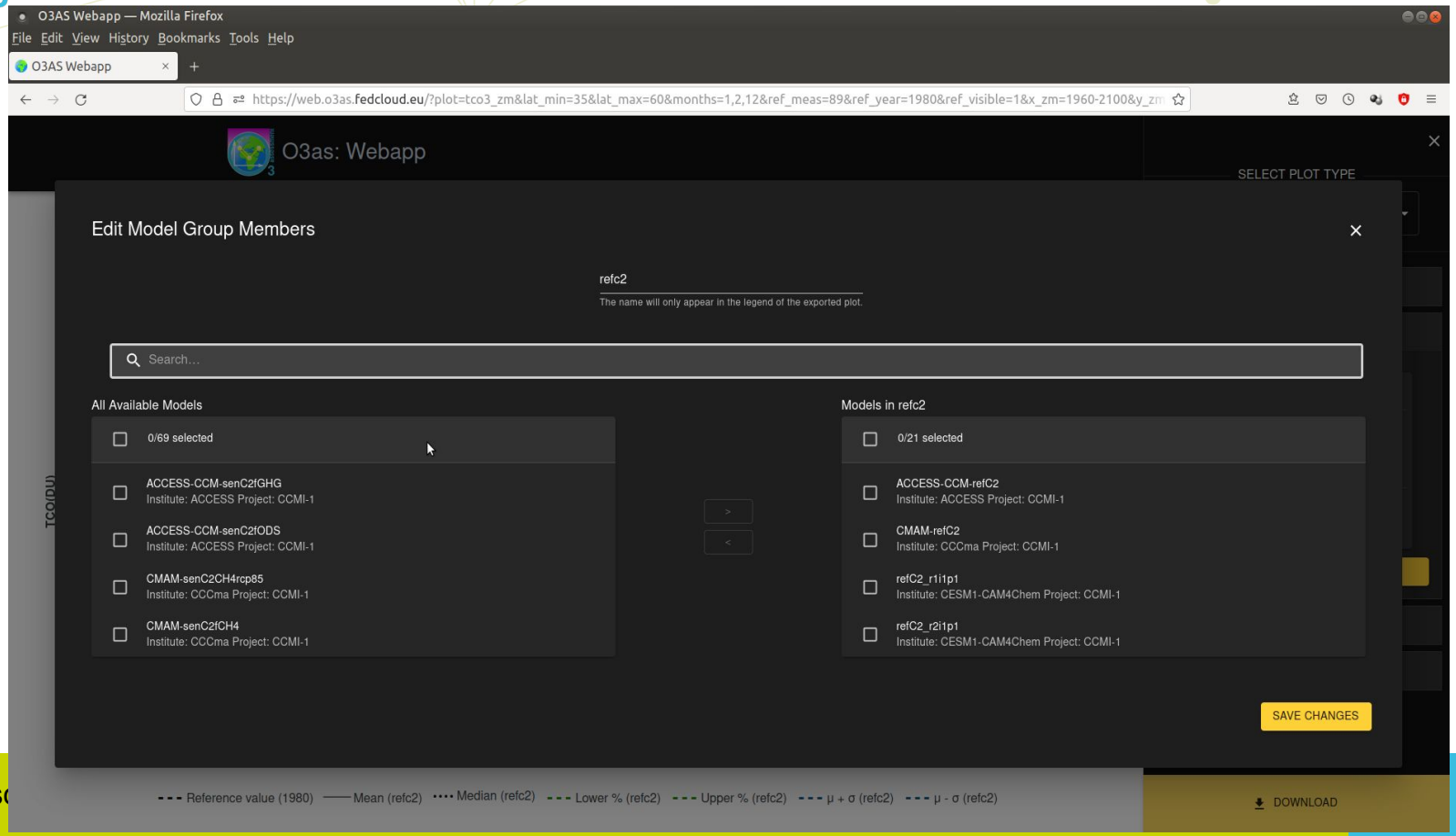
CCMI-1_CHASER-MIROC-ESM-refC2
CCMI-1_CNRM-CERFACS_CNRM-CM5-3-refC2
CCMI-1_CNRM-CERFACS_MOCAGE-refC2
CCMI-1_ETH-PMOD_SOCOL3-refC2
CCMI-1_GSFC_GEOSCCM-refC2
CCMI-1_MESSy_EMAC-L47MA-refC2

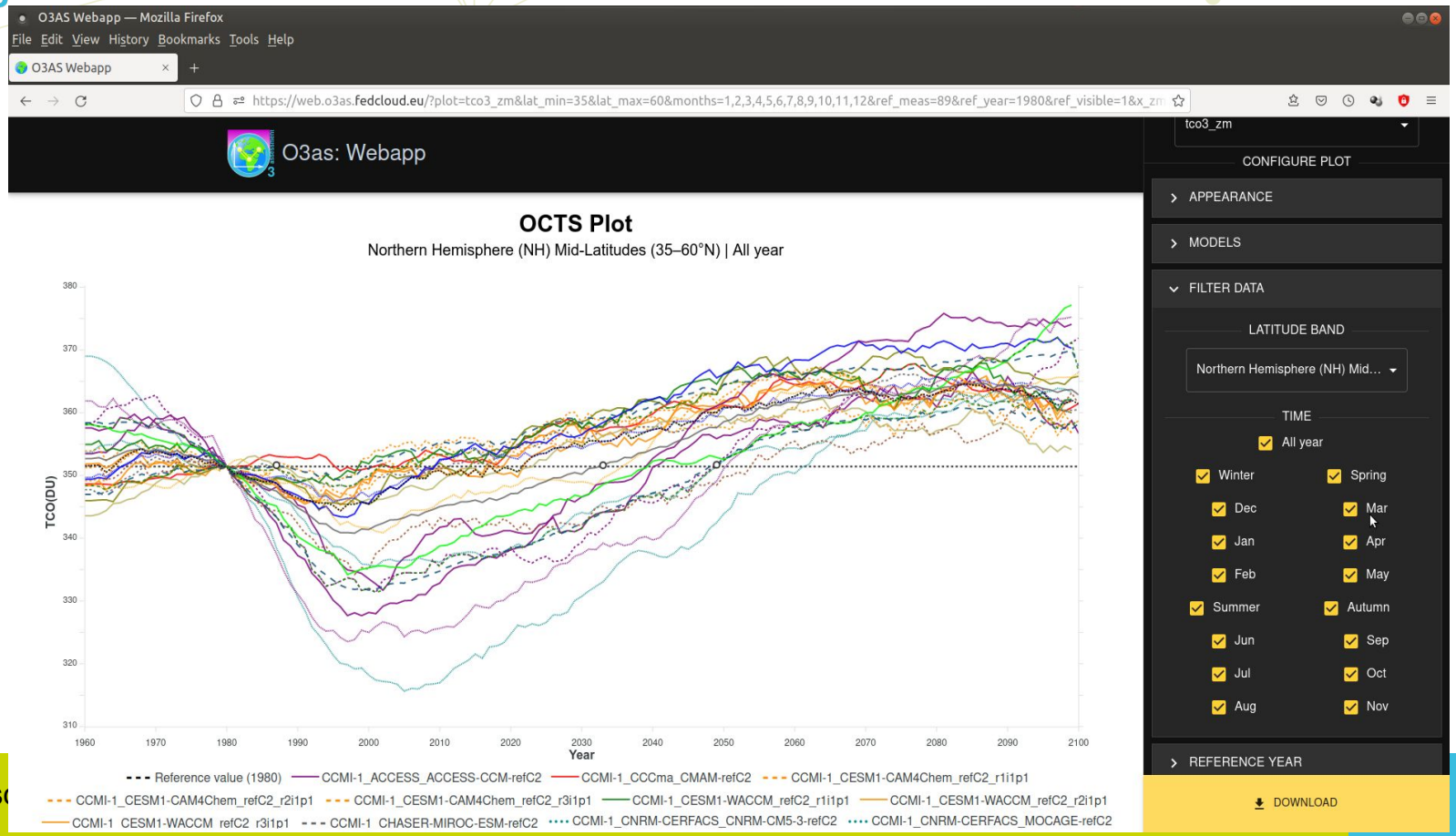
o3webapp: edit graph



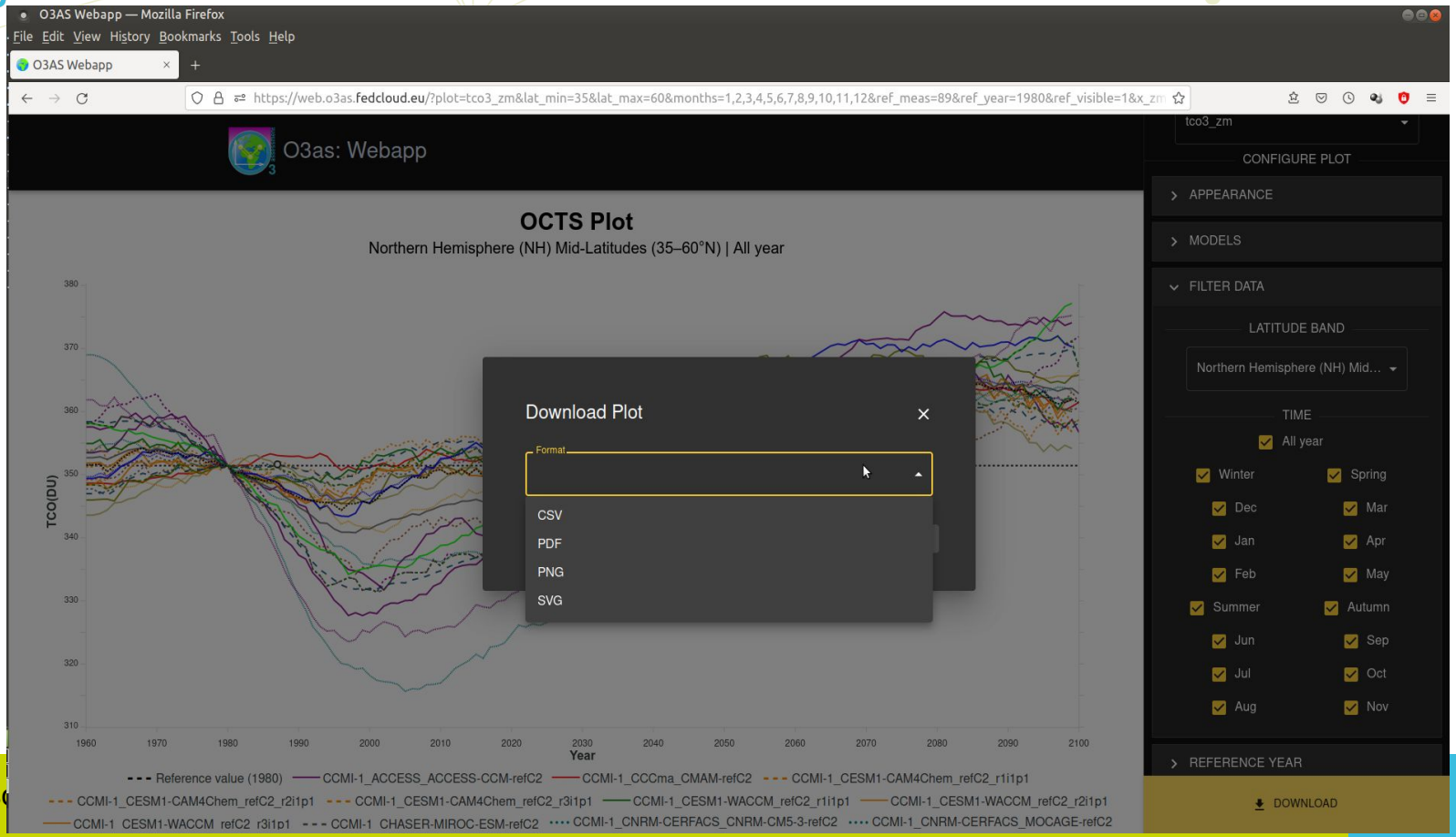
o3webapp: edit model group



o3webapp: filter data



o3webapp: download plot



O3as: Ozone assessment for everyone

Ozone raw data

Large Storage

LSDF

raw

skimmed

HPC

o3skim
CF conventions

skimmed

RADAR4KIT

(public) Data repository

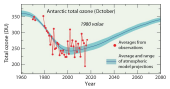
skimmed

o3webapp

HELM

select & process

o3api
(REST API)



Anyone

selected data points

Scientists

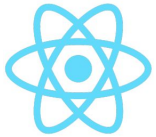
skimmed data

FAIReva
evaluator, validator & advisor

GPL + SQAaaS + docker + Read the Docs + Upptime

O3as: components under the hood

o3webapp:




o3api:




o3skim:


CF Checker



O3as: deployment

o3skim:

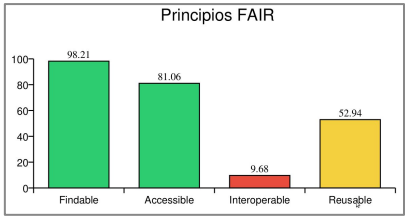
Python Package

OR

Skimmed data

O3as: deployment

Skimmed data:



O3as: deployment

o3api:
o3webapp:

HELM

readinessProbe,
livenessProbe,
HPA

✔ cert-manager ✔ o3as namespace
✔ PersistentVolume ✔ o3as Secrets

Infrastructure Manager

Dynamic DNS
fedcloud.eu

Dynamic DNS

deploy.sh : k8s checks + helm install

Jenkins
automated test of deployment

List of **skimmed published data** sources at **open contribution** via Pull Requests

Summary on the O3as service

O3as for **scientists**:
Researches in an **easy way** retrieve ozone model **data**, perform basic **analysis**, able to create publication ready **plots**

O3as is a service for **everyone**:
e.g. teachers can illustrate ozone science

O3as expands EOSC **capability**

Status: published at EOSC marketplace

Plans: adding more data, further service improvement, automation

O3as public links:

Start here:	o3as.data.kit.edu
Detailed documentation:	o3as.readthedocs.io
Git organisation/repos:	git.scc.kit.edu/synergy.o3as
Docker Hub:	hub.docker.com/u/o3as

Thank you for your attention!