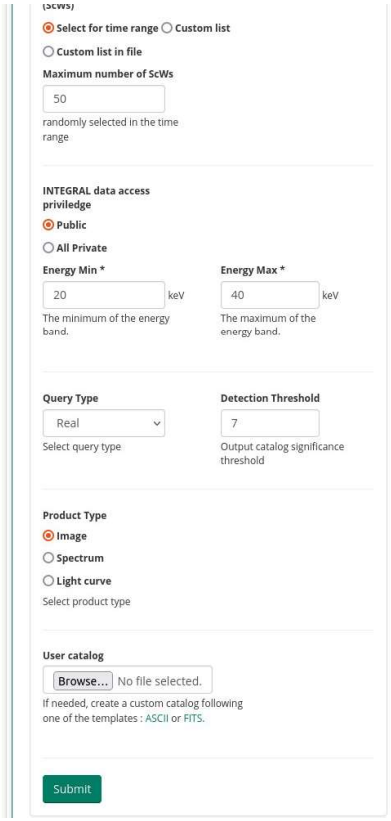
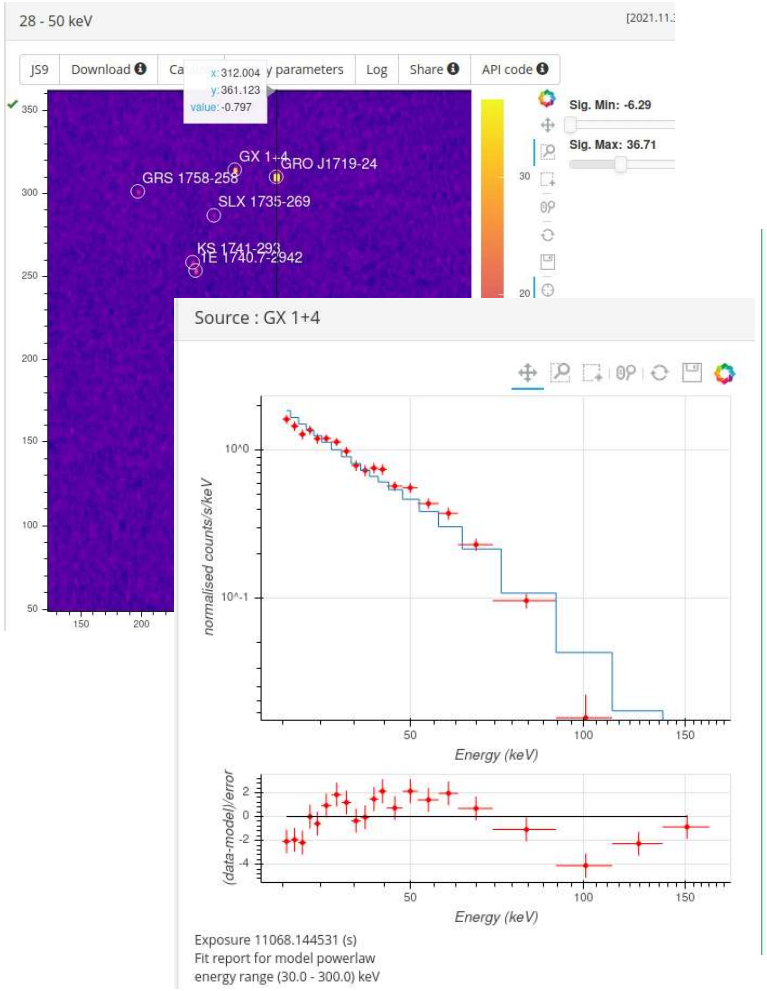
Multi-Messeger Offline Data Analysis (MMODA)

- We also run OSA executable from a web tool or python API (IBIS/ISGRI, JEM-X, and SPI-ACS)
- Fully linked to local HPC cluster





MMODA
Multi-Messenger Online Data Analysis

The MMODA product gallery

MMODA Multi-Messenger Online Data Analysis | UNIVERSITÉ DE GENÈVE FACULTÉ DES SCIENCES | ISDC | EPFL | MMODA PRODUCT GALLERY

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All sources Products per revolution All products Contact

On these pages, we expose a collection of high-level products from the **INTEGRAL IBIS/ISGRI**, and **JEM-X** instruments.

These are obtained through the MMODA online platform through dedicated workflows developed by the INTEGRAL Science Data Centre experts. Our products are *images* for observations, *light curves*, and *spectra* for individual sources. They can be conveniently searched per source name, per satellite revolution, per instrument, time span, and other criteria. Recent Near Real Time data are conveniently displayed per satellite revolutions.

We welcome your feedback and wishes for products that are not yet available, contact us through our MMODA platform.

Notes:

- the the "source type" field is the classification provided by Simbad
- To reproduce the results using the python API to the MMODA service, please see these instructions.

- An explorable collection of high-level products from the IBIS/ISGRI, and JEM-X instruments (for now) all the GRBs etected by BAT in SPI-ACS
- Hosted on a Drupal-powered website with full REST-API access for content creation, editing, and exploration.
- It is actively used to share NRT and CONS products

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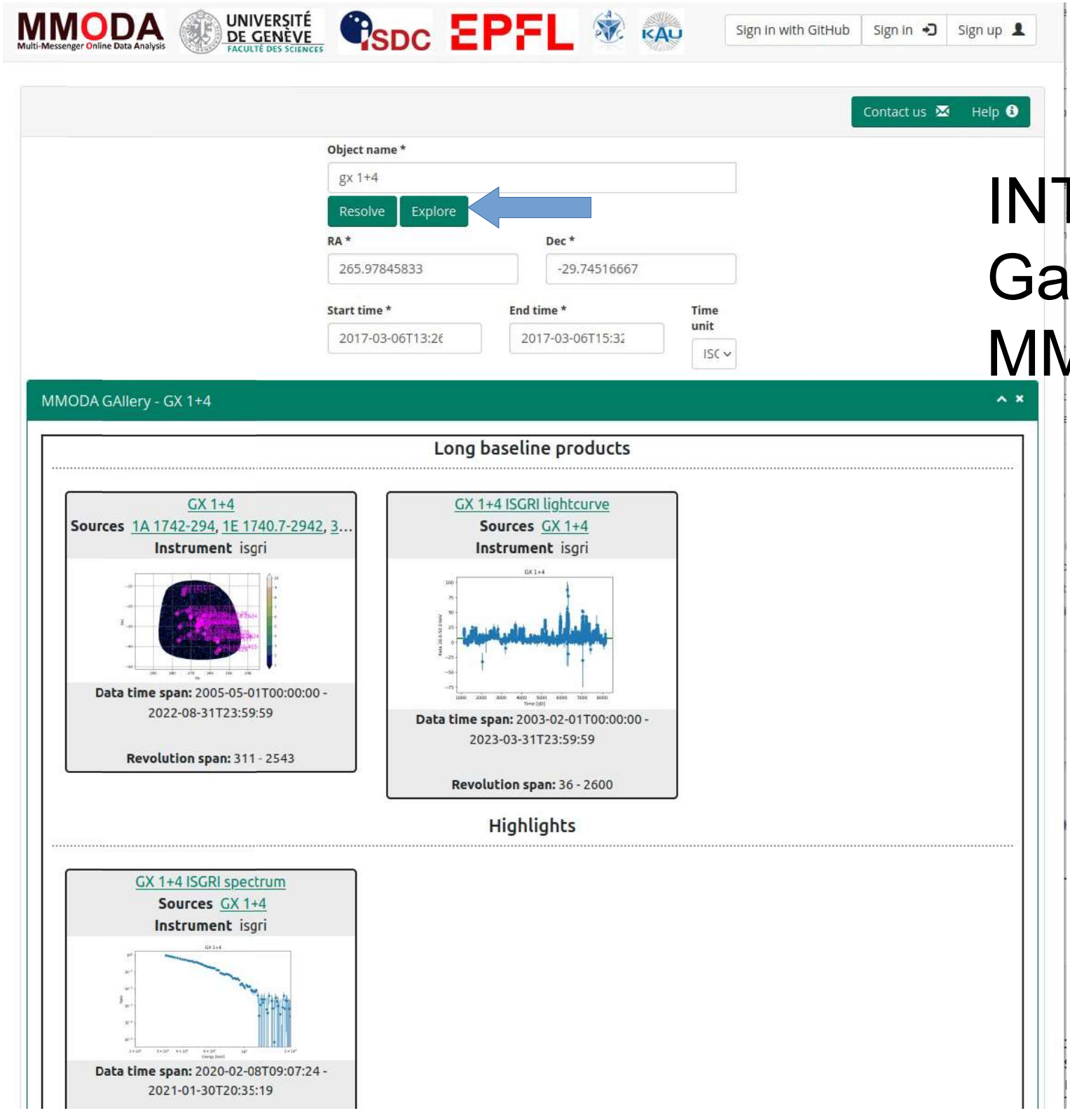
Legacy products as a gallery

- We made a study for legacy products triggered by ESA, we produce:
  - Standard products per each observation in each satellite revolution for Consolidated data: images for IBIS/ISGRI and JEM-X with source fluxes, spectra and light curves for each detected source.
  - Long-term light curve of each significantly bright source
  - Special products for sources: e.g. outburst light curve, spectra over longer campaigns will be provided
  - We are working on integration between Gallery and MMODA



INTEGRATING Gallery with MMODA

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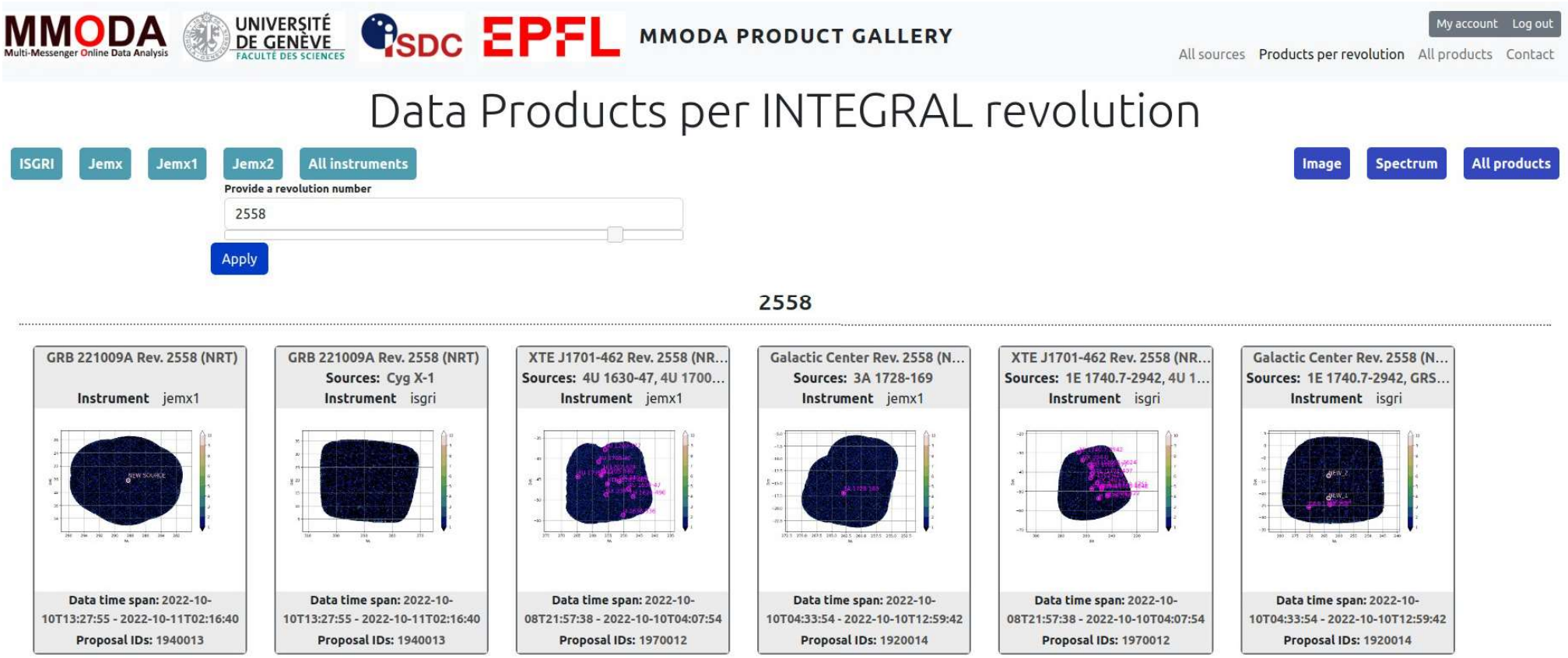
Multi-Messenger Online Data Analysis

Products per revolution

- For each revolution, we collect the observations and for each one, we build a mosaic, we select detected sources and we extract light curves and spectra for each of them.
- Effective Quick Look tool



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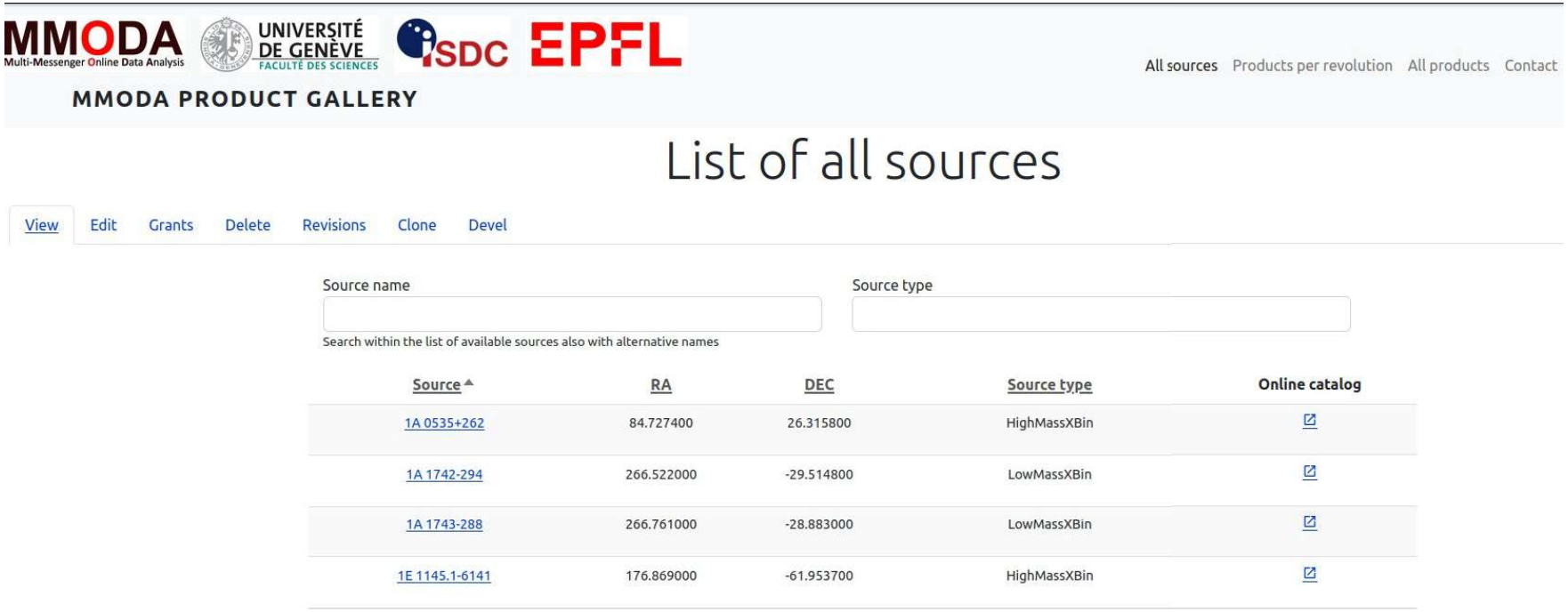
Population plan

- We process ~10-20 revolutions per day **running python notebooks as batch jobs.**
- We started from revolution 100 and arrived to 500 so far.
- We continuously process the last 10 revolutions ingested in the CONS archive to replace the NRT data
- From the sources detected on the timescale of a single observation within a revolution, we build a catalog of sources.
- We WILL use this catalog of sources to create light curves along the full mission.
- Every light curve could be periodically updated to have a real-time database, like Swift/BAT transient source page.
- We exploit the local HPC cluster for this purpose

MMODA
Multi-Messenger Online Data Analysis

INTEGRAL Sources

- Every source that is detected by ISGRI or JEM-X during at least in single observations appears in the Gallery.
- Search can be done also on source class: e.g. all blazars
- We (will) produce long-term light curves for most of them for reference and spectra on certain targeted intervals using a single catalog to optimize resources.



Revision 4 with ISGRI calibration

- ISDC is working to be able to reprocess all data with the latest calibration. Solving some technical issues.
- This will allow us to skip the first three steps of the analysis COR GTI DEAD and save significant time for the Legacy science window archive