1. Introduction
Sun-induced chlorophyll fluorescence (SIF) retrievals methods are based on incident solar irradiance and target radiance measurements. Hence, the main challenge relies in disentangling the reflectance radiance (R) and emitted SIF from the measured target radiance (L^T).

Given the variety of SIF retrieval methods at our disposal, along with the methods’ variables that can be modified, it implies that multiple optimization options have become available for obtaining precise SIF retrieval. In order to streamline and automate this process of fine tuning, we developed a new fluorescence retrieval toolbox called FLuoRence Retrieval Toolbox (FLUOR). In FLUOR, we have implemented the most common SIF retrieval methods that exploit the contrast of the absorption bands being: (1) 3 bands FLD (3FLD), (2) improved FLD (IFLD), (3) Peak Height Method (PHM) and (4) Spectral Fitting Method (SFM).

2. Theory of methods used
Most of the SIF retrieval methods exploit the Fraunhofer line depth (FLD) principle. By combining measurements of down-welling radiance (E^d) and up-welling radiance (L^t) like (IFLD, 3FLD, PHM):

\[
R = \frac{\frac{E^d}{E^t} - \frac{E^t}{E^d}}{\frac{E^d}{E^t} + \frac{E^t}{E^d} - 2} \\
L^t = \frac{E^d}{E^s} \\
L^d = \frac{E^d}{E^s}
\]

The Spectral Fitting method is also implemented into the toolbox, where reflectance and fluorescence are modeled based on a variety of parameterized functions.

3. Processing chain

3.1. Selection of the bands for interpolation
A crucial step when implementing the FLD approaches is to model how E^t, E^d, and apparent reflectance (R_app) vary in the absence of the absorption line. A precise function to interpolate inside the absorption line needs to be defined.

3.2. Select methods and combination of interpolation methods to analyze
Once the bands are selected, the user will be able to select any combination of retrieval methods with interpolation methods, as well as choosing any degree of interpolation for the absorption bands and combinations between them.

3.3. Show the user a first interpolation with the desired sample
The user can show a desired interpolation, check the result and launch the process.

4. Experimental setup and results
The data used has been generated using the radiative transfer model (RTM) FluorSAIL3 and MODTRAN-5 (Berk et al. 2005) to simulate top-of-canopy (TOC) irradiance (E^TOC) and radiance (L^TOC). Combining the chosen values of chlorophyll, F. efficiency, LAI and LAD, 16 types of vegetation are obtained for the study.

5. Conclusions
The FLUOR toolbox aims to analyze all possible combinations of retrieval methods combined with interpolation functions, while allowing the user to choose the boundary bands to apply the interpolation. In case the user adds a reference SIF, a validation analysis can be employed that compares the reference data against the calculated one.

Results suggest that it is not convenient to set the same variables for all the observed samples; each case should be analyzed individually.

This toolbox also enables:
• To give the user the freedom to explore any possible combination of variables and check its robustness by making use of simulated data from RTMs in ARTMO or by external data.
• To visualize the behavior of each sample individually.
• To make use of machine learning methods, already implemented in ARTMO, as alternative interpolation methods.