TITLE: Biogeochemistry Protocol for Satellite Ocean Colour Sensor Validation Volume for the determination of Chlorophyll *a* and accessories pigments by HPLC

Proposers: **Elisabetta Canuti,** European Commission, Joint Research Centre, Ispra, Italy, elisabetta.canuti@ec.europa.eu

Crystal S. Thomas, NASA Goddard Space Flight Center/Science Systems and Applications Inc., Greenbelt, Maryland, 20771, USA, crystal.s.thomas@nasa.gov

Chlorophyll *a* is a fundamental marker of phytoplankton biomass and primary productivity in marine ecosystems. Accessory pigments provide additional insights into phytoplankton community structure and health, thus offering a more comprehensive understanding of oceanic biogeochemistry. With the advancement of ocean colour satellite capabilities (i.e., PACE, etc.) other major phytoplankton pigments (in addition to chlorophyll *a*) can be detected from space.

Here's a brief outline of the proposed protocol:

1. Sample Collection:
    - Standardized sampling protocols employed to ensure consistency across different regions and from various oceanic basins, spanning different seasons and environmental conditions to capture the diversity of phytoplankton communities.
2. Sample Processing:
    - Upon collection, following the samples' preservation chain.
    - Extraction of pigments: carried out using appropriate solvents to ensure efficient recovery and stability.
3. HPLC Analysis:
    - High-Performance Liquid Chromatography (HPLC) utilized for the separation and quantification of chlorophyll *a* and accessory pigments.
        1. Methods presentations-advantages/disadvantages
        2. UHPLC
    - Calibration
    - Quality assurance
        1. Method validation
        2. Quality Control - measures implemented to ensure accuracy and precision in pigment determination
4. Data Interpretation/Uncertainties budget determination:
    - Comparison and validation exercises to assess the performance of single laboratory.

Benefits of the Proposed Protocol:

- Enhanced Validation: By incorporating accessory pigments, the protocol offers a more comprehensive validation of satellite-derived phytoplankton pigment data.
- Improved Understanding: Accessory pigments provide valuable insights into phytoplankton community composition
- Standardization: Standardized protocols ensure consistency and comparability of validation efforts across different research programs and regions.