ACIX: Atmospheric Correction Inter-comparison eXercise

A task carried out in the frame of CEOS WGCV

https://earth.esa.int/web/sppa/meetings-workshops/acix

Jean-Claude Roger [1,2], Eric F. Vermote [2], Ferran Gascon [3], Georgia Doxani [3]; Fabrizio Niro [3]

[1] University of Maryland, United States of America, roger63@umd.edu
[2] NASA Goddard Space Flight Center, United States of America, eric.f.vermote@nasa.gov
[3] European Space Agency, ESA/ESRIN, Frascati, Italy, {Ferran.Gascon, Georgia.Doxani, Fabrizio.Niro}@esa.int

> Abstract

There is a growing need for using surface reflectance (SR) products as input for down-stream products. Space agencies, as ESA and NASA, are planning to generate (or plan to generate in the short term) SR products at global scale for Landsat-8 and Sentinel-2 missions, but there is a need to establish traceability and inter-operability across missions and products. The uncertainty of SR products is still not well established at global scale and needs to be further investigated. Thus, an atmospheric correction (AC) inter-comparison exercise (ACIX) has been decided between NASA and ESA in the frame of CEOS Working Group on Calibration and Validation (WGCV).

ACIX is an international collaborative initiative to inter-compare a set of AC processors for high-spatial resolution optical sensors. The inter-comparison of the derived Bottom-of-Atmosphere (BOA) products is expected to contribute to the understanding of the different uncertainty contributors and help in improving the AC processors.

> Objectives And Expected Outcomes

The exercise aims to bring together the developers of AC processors, who are invited to generate the corresponding BOA products. The input data will be Landsat-8 and Sentinel-2 imagery of various test sites, i.e. coastal, agricultural, snow/artic areas and deserts. A common and harmonized inter-comparison procedure will be agreed and followed by all the participants.

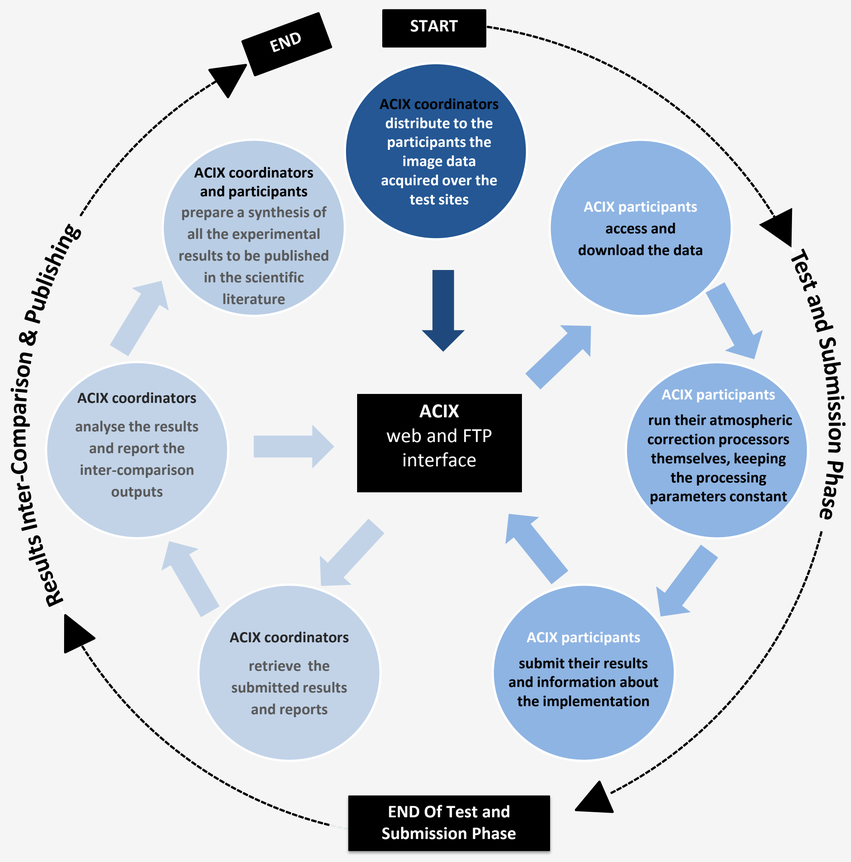
Objectives

- To elaborate **concepts, protocols and guidelines** for the inter-comparison and validation of BOA products
- To better understand **BOA reflectance uncertainty contributors** by comparing the outputs of different AC schemes
- To identify and review the **different uncertainty contributors**
- To propose **further improvements** of the available AC schemes

Expected Outcomes

- Description of **concept, protocols and procedures** for inter-comparing and validating products
- Assessment of the **relative differences** among the inter-compared AC processors results
- Definition of **key regions** and **key periods** for validation and quality assessment
- Description of a **coordinated plan** for inter-comparison and validation activities

> Implementation Framework



The Atmospheric Correction Inter-comparison Exercise will be performed in 3 phases:

- **Definition of the inter-comparison protocol**: The participants are invited to propose a protocol for the AC processors inter-comparison. All the proposals will be discussed in the workshop and the final inter-comparison procedure will be agreed by all participants.
- **Application of the AC processors**: The participants will apply their AC schemes on the test cases keeping the processing parameters constant. The results will be submitted for analysis (3rd phase) to ACIX coordinators.
- **Analysis of the results**: The ACIX coordinators will analyse the submitted results from all participants and will assess the inter-comparison outputs based on the agreed metrics. All the results will be announced to participants prior to the 2nd ACIX workshop, where they will be presented and discussed.

> Dates And Venue

~~1st ACIX Workshop Announcement~~	~~25 January 2015~~
~~1st ACIX Workshop Registration Deadline~~	~~15 March 2016~~
~~1st ACIX Workshop Preliminary programme~~	~~30 April 2016~~
Proposals for AC Inter-comparison Protocol Deadline	31 May 2016
1st Workshop of CEOS WGCV ACIX	**21-22 June 2016**
Results Submission Deadline	15 September 2016
Results Analysis Report	15 November 2016
2nd Workshop of CEOS WGCV ACIX	December 2016/ January 2017

Venue of the 1st ACIX Workshop

- **University of Maryland Research Park**

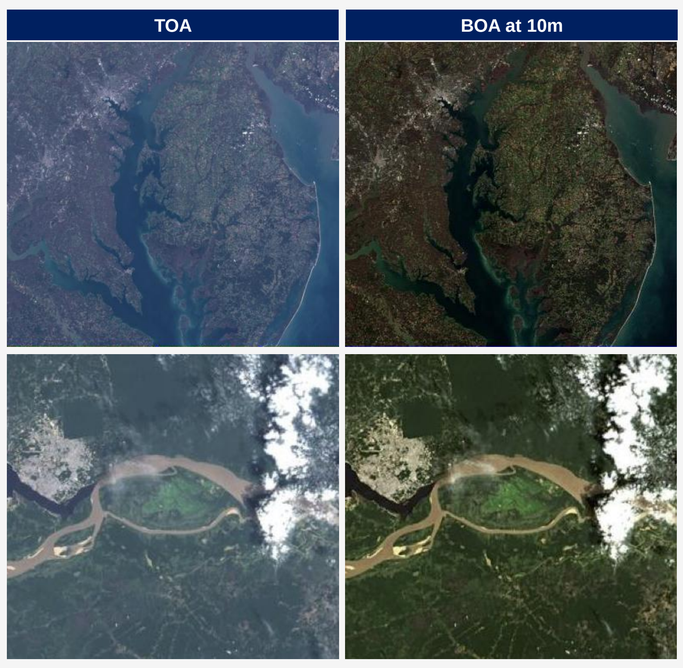
  College Park Marriott Hotel & Conference Center
  3501 University Blvd. E, Adelphi, MD 20783, USA

> Examples of AC Results

Sentinel- 2A

Site Name:	Urban Easton-MDE (USA)
Zone:	MidlatitudeN
Relief:	Flat
Land Cover:	Forest, Croplands, Water
Image Acquisition Date:	2 January 2016

Site Name:	ARM_Manacapuru (Brazil)
Zone:	Tropical
Relief:	Flat
Land Cover:	Tropical Forest
Image Acquisition Date:	9 January 2016



Landsat- 8

Site Name:	Carpentras (France)
Zone:	MidlatitudeN
Relief:	Flat
Land Cover:	Croplands, Water, Urban
Image Acquisition Date:	9 November 2015

Site Name:	ARM_Manacapuru (Brazil)
Zone:	Tropical
Relief:	Flat
Land Cover:	Tropical Forest
Image Acquisition Date:	8 January 2016