

Virtual Event: ECMWF-ESA Workshop on Machine Learning for Earth System Observation and Prediction



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Type: **Oral presentation**

Artificial Intelligence in ESA Contribution to the United Nations Framework Convention on Climate Change (UNFCCC) : An Overview

Tuesday, 6 October 2020 09:30 (30 minutes)

Climate change is arguably the greatest challenge facing humankind in the twenty-first century. The United Nations Framework Convention on Climate Change (UNFCCC) provides the vehicle for multilateral action to combat climate change and its impacts on humanity and ecosystems. In order to make decisions on climate change mitigation and adaptation, the UNFCCC requires a systematic monitoring of the global climate system.

The objective of the ESA Climate Change Initiative (CCI) programme is to realise the full potential of the long term global EO archive that ESA together with its Member States have established over the last 35 years, as a significant and timely contribution to the climate data record required by the UNFCCC.

Since 2010 the programme has contributed to a rapidly expanding body of scientific knowledge on 22 Essential Climate Variables (ECVs), through the production of Climate Data Records. Although varying across geophysical parameters, ESA Climate Data Records follow a community-driven data standards, so facilitating their blending and application.

AI has played a pivotal role in the production of these Climate Data Records. Eleven CCI projects - Aerosol CCI, Cloud CCI, Fire CCI, Greenhouse Gases CCI, Ocean Colour CCI, Sea Level CCI, Soil Moisture CCI, High Resolution Landcover CCI, Biomass CCI, Permafrost CCI, and Sea Surface Salinity CCI - have applied AI in their data record production and research, or identified specific AI usage for their research roadmap.

The use of AI in these CCI projects is varied, for example to detect burned areas in Fire CCI, to retrieve dust Aerosol Optical Depth from thermal infrared spectra in Aerosol CCI, and pixel classification via a custom built AI tool in Ocean Colour CCI. Moreover, the ESA climate community have identified climate science gaps in context to ECVs with the potential for meaningful advancement through AI.

Thematic area

1. Machine Learning for Earth System Observations - Including Retrieval Algorithms, Fast/Improved/New Forward Models, Advanced Quality Control, De-biasing Techniques

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Session Classification: Session 2 (cont.): ML for Earth System Observations

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