

Joint Training in Atmospheric Composition (online) 6-17 December, 2021

AGENDA

Time (CET)	Agenda day 1, Monday 6 Dec	Speakers
09:30	Welcome and introduction to course	Chris Stewart (ECMWF), Federico Fierli (EUMETSAT), Christian Retscher (ESA)
09:45	Icebreaker	
09:50	Lecture: Chemical species and aerosols Intro to atmospheric processes in space and time (short to medium term processes).	Guy Brasseur (Max Planck Institute for Meteorology)
10:30	Q&A	
10:40	Lecture: Greenhouse gases Intro to atmospheric processes, focus on GHG.	Anna Agusti-Panareda (ECMWF)
11:20	Q&A	
11:30	<i>Coffee break</i>	
11:40	Lecture: Atmospheric composition monitoring and forecasting Intro to modelling and forecasting, satellite & in-situ data, remote sensing, DA.	Johannes Flemming (ECMWF)
12:20	Q&A	
12:30	<i>Lunch</i>	
13:30	Model data discovery practical Data discovery: access, visualisation and exploration of model data through Jupyter notebooks. Please find here the link to the practical: https://github.com/ecmwf-projects/copernicus-training/blob/master/Atmos-Training_CAMS-Atmospheric-Composition.ipynb ASSIGNMENT 1: Run the notebook above, and use it as a template to carry out a similar analysis of atmospheric data from the ADS. Some suggestions include the following:	Chris Stewart (ECMWF), Julia Wagemann (ECMWF), Miha Razinger (ECMWF)

	<ul style="list-style-type: none"> Plot image of SO₂ emissions from Cumbre Vieja volcano in September 2021, and perhaps also analyse the vertical profile. View Saharan dust transport across Atlantic in July 2020. View emissions from similar wildfire activities. <p>Submit your results as images, animations, PDF of notebook files or other to the Padlet link for this practical sent to you via email (if you did not receive the email, please check your spam!)</p> <p>Remember, there are prizes for the best results!</p>	
14:30	<i>End of day 1</i>	
Time (CET)	Agenda day 2. Wed 8 Dec	Speaker
09:30	Welcome back and introduction to day 2 agenda + icebreaker	Mark Parrington (ECMWF)
09:40	Lecture: Modelling introduction Basics in atmospheric composition modelling. Global vs regional modelling, boundary conditions, bias correction, statistical/dynamical downscaling.	Apostolos Voulgarakis (Technical University of Crete/Imperial College London)
10:20	Q&A	
10:30	Lecture: Modelling examples & validation Examples of models (e.g. used in CAMS). Validation and quality control.	Henk Eskes (KNMI)
11:10	Q&A	
11:20	<i>Coffee break</i>	
11:30	Lecture: Data assimilation and Inverse modelling Basics of inverse modelling and assimilation of satellite and in-situ data into models. Analysis, reanalysis, monitoring.	Antje Inness (ECMWF)
12:10	Q&A	
12:20	<i>Lunch</i>	
13:30	Assignment 1 Q&A Assignment 1 feedback and Q&A.	Chris Stewart (ECMWF), Julia Wagemann (ECMWF), Miha Razinger (ECMWF)
14:00	Data assimilation practical Practical on basics of inverse modelling and data assimilation.	Antje Inness (ECMWF), Alba Vilanova (Meteomatics AG), Miha Razinger (ECMWF)
15:00	<i>End of day 2</i>	

Time (CET)	Agenda day 3. Fri 10 Dec	Speaker
09:30	Welcome back and introduction to day 3 agenda + icebreaker	Christian Retscher (ESA)
09:40	Lecture: Satellite observations Missions, instruments, data & product types.	Christian Retscher (ESA) Federico Fierli (EUMETSAT)
10:20	Q&A	
10:30	Lecture: Remote sensing retrievals from satellite data Remote sensing in UV-IR-MW. Retrieval techniques for different species.	Anu-Maija Sundström (Finnish Meteorological Institute)
11:10	Q&A	
11:20	<i>Coffee break</i>	
11:30	Lecture: In-situ networks In-situ instruments, networks and retrieval techniques for chemical species and aerosols. Added value of profiling observations from the ground.	Ann Mari Fjæraa (NILU – Norwegian Institute for Air Research)
12:10	Q&A	
12:20	<i>Lunch</i>	
13:30	Assignment 2 Q&A Feedback, lessons learned from assignment 2.	Alba Vilanova (Meteomatics AG)
14:00	Observations data discovery practical Data discovery: access, visualisation and exploration of observation data through Jupyter notebooks.	Julia Wagemann (EUMETSAT)
15:00	<i>End of day 3</i>	
Time (CET)	Agenda day 4. Tue 14 Dec	Speaker
09:30	Welcome back and introduction to day 4 agenda + icebreaker	Chris Stewart (ECMWF)
09:40	Lecture: Emissions inventories Importance of emissions inventories. Inventory types, sources & challenges.	Hugo Denier van der Gon (TNO)
10:20	Q&A	
10:30	Lecture: Operational forecasting The production chain from input collection to ingestion and forecasts then dissemination (ADS), and evaluation.	Martin Suttie (ECMWF)
11:10	Q&A	
11:20	<i>Coffee break</i>	

11:30	Lecture: Atmospheric composition policy and services Air quality and greenhouse gas policy, public/commercial needs, regulations, etc. Public/commercial services and applications.	Leonor Tarrasón (NILU - Norwegian Institute for Air Research)
12:10	Q&A	
12:20	<i>Lunch</i>	
13:30	Assignment 3 Q&A Feedback, lessons learned from assignment 3.	Julia Wagemann (EUMETSAT)
14:00	Data analysis practical Air Quality Index (AQI) calculation and case study analysis.	Julia Wagemann (ECMWF), Miha Razinger (ECMWF), Chris Stewart (ECMWF)
15:00	<i>End of day 4</i>	
Time (CET)	Agenda day 5. Fri 17 Dec	Speaker
09:50	Welcome back and introduction to day 5 agenda + icebreaker	Federico Fierli (EUMETSAT)
10:00	Assignment 4 Q&A Feedback, lessons learned from assignment 4.	Julia Wagemann (ECMWF), Miha Razinger (ECMWF), Chris Stewart (ECMWF)
10:30	Lecture: Future CO2 monitoring & verification support capacity Ramp-up of CO2 monitoring & verification support capacity.	Erik Andersson (ECMWF seconded to EC)
11:10	Q&A	
11:20	<i>Coffee break</i>	
11:30	Lecture: Future observations Added value of future systems (in particular S4, S5, CO2M, Metop-SG).	Christian Retscher (ESA) Federico Fierli (EUMETSAT)
12:10	Q&A	
12:20	<i>Lunch</i>	
13:40	Lecture: Current status and future developments in modelling Current research areas for global & regional systems. Challenges and foreseen improvements. Current status of modelling and DA.	Gabriele Pfister (UCAR NCAR)
14:20	Q&A	
14:30	Further study options Overview of learning resources for further reading and study.	Chris Stewart (ECMWF), Federico Fierli (EUMETSAT), Christian Retscher (ESA)



14:45	<i>Conclusions</i> <i>Students complete evaluation questionnaire</i> <i>End of course</i>	
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