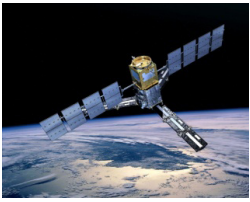
2017

ERCA

European Research Course on Atmospheres



25th session from

JANUARY 11TH to

FEBRUARY 9TH

Grenoble, FRANCE

PRACTICAL GUIDE

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ERCA SUPPORTS

> The Grenoble Alpes University (UGA)

> The Centre National de la Recherche Scientifique (CNRS)

> Supports from international agencies

> Supports from national agencies

> Supports from local agencies

The Grenoble Alpes University (UGA) is born of the merger of three Grenoble universities: Université Joseph Fourier, Université Pierre-Mendès-France and Université Stendhal. Currently and from more than 20 years through UJF, the Grenoble Alpes University has been the major support to ERCA. UGA trains more than 45000 students and operates 80 research laboratories. It is rated as one of the leading French universities in international ranking (Reuters, Shanghai, Times Higher Education, QS…) and among the top 100 universities in the domain of environmental sciences in June 2016 (ranked 72th in geosciences and 80th in environment / ecology in the 2016 National Taiwan university ranking).

The Centre National de la Recherche Scientifique (CNRS), French leading operator of research, has been supported ERCA also since the beginning, providing staff and logistics.
The National Institute for Earth Sciences and Astronomy (INSU) aims to design, promote and coordinate national and international research in the fields of astronomy, solid Earth, ocean, atmospheric and space sciences.

Supports from international agencies

The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.

Max-Planck Institute for Chemistry (MPIC). The leading German agency for funding and managing research, training and knowledge exchange in chemistry. It carries out investigations of the earth system and chemical processes in the atmosphere as well as the interactions between air, water, earth and mankind.

Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research (GKSS): As a member of the Helmholtz Association of German Research Centres, the largest scientific organization in Germany, the Helmholtz-Zentrum Geesthacht is engaged in long-term activities in the fields of materials and coastal research that are making a major contribution to resolving the large and pressing issues facing society and the scientific and business worlds.

The Abdus Salam International Centre for Theoretical Physics (ICTP): Founded in 1964 by the late Nobel Laureate Abdus Salam, ICTP has been a driving force behind global efforts to advance scientific expertise in the developing world, under the auspices of the Italian government, UNESCO and IAEA.

The Global Atmosphere Watch (GAW), programme of WMO, is a partnership involving the Members of WMO, contributing networks and collaborating organizations and bodies which provides reliable scientific data and information on the chemical composition of the atmosphere, its natural and anthropogenic change, and helps to improve the understanding of interactions between the atmosphere, the oceans and the biosphere. GAW focal areas are aerosols, greenhouse gases, selected reactive gases, ozone, UV radiation and precipitation chemistry (or atmospheric deposition).

Supports from national agencies

The French Ministère for Higher Education and Research supports participants from Eastern Europe, Asia, and Southern America with the ACCES and the 'Investissement d'Avenir' programs.

Institut de Recherche pour le Développement (IRD) has focused its research for over 65 years on the relationship between man and its environment, in Africa, Mediterranean, Latin America, Asia and the French tropical overseas territories. Its research, training and innovation activities are intended to contribute to the social, economic and cultural development of southern countries.

Observatoire de Haute Provence (OHP) is a premier observatory site for astronomy, environment, and the study of atmosphere. As a national facility for astronomy it welcomes visiting astronomers.

Centre National d'Etudes Spatiales (CNES, National Agency for Space Studies) is the government agency responsible for shaping and implementing France's space policy in Europe.

Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME, French Environment and Energy Management Agency) is a public agency which aims are to encourage, supervise, coordinate, facilitate and undertake operations with the aim of protecting the environment and managing energy.

IRSTEA is a research organization which, since more than 30 years, works on major issues of a responsible agriculture and territories sustainable planning, water management and related risks, drought, floods, inundations, the biodiversity and complex ecosystems study in their interrelation with human activities.

Météo-France is France national service of meteorology and climatology. Its main mission is to provide vigilance meteorological information to secure people and goods.
Centre d'Etudes de la Neige (CEN) in Grenoble is Météo-France centre dedicated to snow and avalanches.

Supports from local agencies

The Observatoire des Sciences de l'Univers de Grenoble (OSUG) is a geosciences observatory within the University of Grenoble, grouping sixth laboratories. It supports ERCA with the Labex2020 program.

The Physics, Engineering, Mecanics, and geosciences department (PhITEM) of the University of Grenoble.

The Collège Doctoral (Doctoral school) of the University of Grenoble manages about 3700 PhD students and is especially responsible of their training.

Région Auvergne-Rhône-Alpes is France second region (8M inhabitants and 11% of GDP) and one of the leading European ones, with a very active economy. It largely invests in the university and research area, with over 300,000 students.

The **Conseil Général** de l'Isère runs the Isère region.

Grenoble Alpes Métropole operates the urban area around Grenoble.

ERCA PROGRAM

> WEEK 1: GRENOBLE

> WEEK 2: GRENOBLE

> WEEK 3: GRENOBLE

> WEEK 4: GRENOBLE

> WEEK 5: OBSERVATOIRE de Haute Provence (OHP)

NB: the programme is always subject to change
in case of cancellation or strong weather perturbations.

> First 4 weeks: Wednesday 11th January to Friday 3rd of February 2017 - Grenoble

Lectures are at the Maison des Magistères (cf. 'Practical Information') with very few exceptions.

WEEK 1: GRENOBLE

Tuesday 10 January 2017	
17.00-21.00	**Welcome of ERCA2017 Participants** at the hall of Residence Marie-Curie
19.00-21.00	**Buffet for ERCA2017 Participants** at the Residence Marie-Curie

Wednesday 11 January 2017 IMAG / auditorium	
10.00-10.30	**Welcome Coffee** IMAG building, 700 rue Centrale, University campus, 38400 Saint Martin d'Hères
10.30-11.15	**Official opening - Amphitheatre at IMAG building** By **ERCA director** and representatives of ERCA main supports
11.15-12.15	**Keynote lecture Gaël GIRAUD**, economist, Director of Agence Française de Développement: Climate change and development aid
12.15-14.00	**Buffet** IMAG
14.00-15:30	**Francis Codron** Fondamentals on atmospheric dynamics
15.30-16.00	**Coffee break**
16.00-17.30	**Eugene Clothiaux,** Atmospheric radiation: basic physics and concepts
18.30	**Ice-breaking party** Café des Arts, downtown, 36 Rue Saint Laurent, Grenoble (the plan is on page 20)

→ Official Opening

	Thursday 12/01/2017 Maison des Magistères	Friday 13/01/2017 Maison des Magistères
9.00-10.30	**Francis Codron** *Fondamentals on atmospheric dynamics*	**Eugene Clothiaux** *Radiation through clear and cloudy atmospheres*
10.30-10.45	Coffee break	Coffee break
10.45-12:15	**Ralf Ebinghaus** *Emission sources, regional and global distribution of atmospheric mercury*	**Ralf Ebinghaus** *Emission sources, regional and global distribution of persistant organic pollutants (POPs)*
12.15-13.45	Lunch at H2 cafeteria	Lunch at H2 cafeteria
13.45-15.15	**Introduction of the project** **Didier Voisin & Jean Lilensten**	**Eugene Clothiaux** *Radiation and Remote Sensing: A Few Current Applications*
15.15-15.30	*Break*	*Break*
15.30-17.00	**Introduction of the project** **Didier Voisin & Jean Lilensten**	**Francis Codron** *Fondamentals on atmospheric dynamics*

→ Saturday 14th January 2017: snowshoes day trip organized by ERCA

ERCA will organize a snowshoe day trip.

Do not forget to bring:

- → Warm and waterproof clothes (gloves are very important)
- → Waterproof shoes/boots (if possible, sturdy ankle boots)
- → Sun glasses and cream (if the weather is sunny…)
- → A backpack
- → A bottle of water and your own picnic

Participants will be transported to Belledonne mountains by a special bus. Departure at 8 am from your hotel. Arrival by 17 pm at your hotel. The trip will be accompanied by professional mountain guides. Snowshoes and walking poles will be provided.

WEEK 2: GRENOBLE

	Monday 16/01	Tuesday 17/01	Wednesday 18/01	Thursday 19/01	Friday 20/01
9.00-10.30	**Peter Brimblecombe** Air pollutants and their health impact	**Peter Brimblecombe** Indoor air pollution	**Anne Monod** Secondary organic aerosol in the troposphere: formation, fate and impacts (part 2)	**Tao Wang** Photochemical ozone and smog in China: insights learned from several large research projects	**Poster session IGE/LGGE**
10.30-10.45	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
10.45-12.15	**Anne Monod** Atmospheric chemistry and photochemistry	**Caroline Brimblecombe** Developing focus and productivity in academic and technical writing	**Tao Wang** Air pollution in China: a review of control efforts, their effectiveness, and challenges	**Project work**	**Poster session IGE/LGGE**
12.15-13.45	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch Buffet at IGE/LGGE
13.45-15.15	**Project work**	**Peter Brimblecombe** Climate change and cultural heritage	**Project work**	**Project work**	**Coriolis / IGE-LGGE visits**
15.15-15.30	Break	Break	Break	Break	Break
15.30-17.00	**Project work**	**Anne Monod** Secondary organic aerosol in the troposphere: formation, fate and impacts (part 1)	**Project work**	**Project work**	**Coriolis / IGE-LGGE visits**
18.30	Debate: *Café des arts* **Jean LILENSTEN** "Philosophy of science"				Participants take their posters with them in order to expose them on Monday 23rd in Maison des Magistères

→ Coriolis and IGE/LGGE visit

Participants will split into two groups to visit the Coriolis experiment and the IGE/LGGE on Friday 20 January 2017 after the poster session and lunch at LGGE.

The Institute of Geoscience in Environment (IGE) & Laboratory of Glaciology and Geophysics of the Environment (LGGE)

Discover IGE & LGGE:
http://lgge.osug.fr **and** http://ige.osug.fr *(start 2 January 2017).*

Street address: 54 Rue Molière, Domaine Universitaire, 38400 Saint-Martin-d'Hères, on the university campus, very close to tramway B stop "Les Taillées".

LGGE is an Institute of the French National Center for Scientific Research (CNRS) and the University Joseph-Fourier of Grenoble. Its scientific reputation is based on outstanding research achievements related to the reconstruction of past changes of climate and atmospheric composition during the last climatic cycles from polar ice cores. These studies are based on the well preserved frozen atmospheric archives which have been obtained by ice drilling in the central plateau areas of Antarctica and Greenland. The time periods under investigation now include the last nine climatic cycles as well as the Holocene and the last few centuries. Current investigations also include the study of the physical and mechanical properties of the ice, modelling of ice caps, chemical exchanges between the low atmosphere and snow and ice fields, remote sensing of snow and ice covered areas in polar and temperate regions, mass balance of Alpine and Andean glaciers as well as high latitude climate modelling and atmospheric chemistry modelling. Research carried out at LGGE combines technological and analytical approaches. Of particular importance are polar field campaigns organised in the frame of international programmes such as the European Programme for Ice Coring in Antarctica (EPICA), as well as field parties in the Alps, the Arctic, the Andes and the Himalayas. Research conducted at LGGE contributes to a better understanding of important scientific issues which are fundamental to our society as a whole, such as the greenhouse effect, climate and environmental changes, atmospheric pollution at global and regional scales, as well as risks associated with glaciers.

The Coriolis platform (LEGI)

Discover the coriolis platform:
http://servforge.legi.grenoble-inp.fr/projects/le-coriolis-platform/wiki

Street address: Laboratoire LEGI, 1209-1211 rue de la piscine, Domaine Universitaire, 38400 Saint Martin d'Hères, on the university campus.

"The Coriolis platform, 13 m in diameter, is the largest rotating platform in the world dedicated to fluid dynamics. Its main activity is the experimental modeling of geophysical flows, taking into account the rotation of the Earth, in the presence or not of density stratification or topography. The large size provides access to the inertial regimes that characterize ocean dynamics, with little influence of viscosity and centrifugal force. Laboratory experiments can thus provide support to model ocean dynamics and develop their physical parameterizations." The platform is run by the LEGI laboratory. It belongs to the European HYDRALAB and EuHIT infrastructures.

→ Practical session with Caroline Brimblecombe on Monday 11 January 2017

Do you find it's difficult to write or do you need to get a lot written in short period of time? This workshop will teach techniques to help you improve your output when time is limited.

The workshop will provide an introduction to focused free-writing, an established technique used by writers in many fields, from creative writing to the sciences. Themes explored include writing as a discipline as well as a creative act, writing as a shared experience, and being productive with the time you have available. The focus will be on aspects of the technique that are well-suited to drafting manuscripts and reports.

The initial approach is prescriptive and then we discuss how to adapt to circumstances and share ideas on how to apply the method to your own work.

WEEK 3: GRENOBLE

	Monday 23/01	Tuesday 24/01	Wednesday 25/01	Thursday 26/01	Friday 27/01
9.00-10.30	**Markus Quante** The role of clouds in climate and environment	**Jed Kaplan** The co-evolution of the Earth System and human civilizations over the preindustrial Holocene TBC	**Stéphane La Branche** Climate game Introduction	**Yoav Yair** From ions to thunderstorms: a review of atmospheric electricity	**Carlo Barbante** Ice-core records of climate and atmospheric chemistry
10.30-10.45	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
10.45-12:15	**Benoît Hingray** Climate variability, renewable energy production and decision scaling	**Markus Quante** Clouds and precipitation physics	**Irène Xueref-Rémy** The carbon cycle	**Give back project**	**Yoav Yair** Lightning in the solar system and beyond
12.15-13.45	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria
13.45-15.15	**Project work**	**Jed Kaplan** The role of land surface processes in the climate system: Global modeling of biogeophysical and biogeochemi-cal feedbacks	**Project work**	**Give back project**	**Stephane La Branche** Climate game
15.15-15.30	Break	Break	Break	Break	Break
15.30-17.00	**Project work**	**Barbara Nozière** Aerosols and warm cloud formation	**Project work**	**Carlo Barbante** Ice core records as archives of past climate and atmospheric composition	**Stephane La Branche** Climate game
18.30	Debate: *Café des arts* **Julien le Sommer** Emails revolutionized scientific research; what about social media?				

WEEK 4: GRENOBLE

	Monday 30/01	Tuesday 31/01	Wednesday 01/02	Thursday 02/02	Friday 03/02
9.00-10.30	**Mark Flanner** Snow and Climate	**Jasa Calogovic** Composite analysis and Monte Carlo methods, an example with Forbush decreases and cloud cover	**Yinon Rudich:** From deserts to reefs: global processes of mineral dust	**Andreas Richter** Nitrogen oxides in the troposphere-sources, distributions, impacts and trends	**Filippo Giorgi** Climate change and the hydrologic cycle
10.30-10.45	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
10.45-12.15	**Ilya Usoskin** The variable Sun (solar magnetic activity and cycles)	**Evaluation panels**	**Andreas Richter** Satellite measurements of troposphere composition: principles, results, and future developments	**Ilya Usoskin** The Heliosphere and solar wind	**Julien le Sommer** Role of the oceans in the climate system: processes and time-scales
12.15-13.45	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria	Lunch at H2 cafeteria
13.45-15.15	**Jasa Calogovic** A cosmic ray–cloud link and cloud observations	**Evaluation panels**	**Yinon Rudich:** Optical properties of aerosols : theory and new measurement methods	**Filippo Giorgi** Regional climate modeling; update and CORDEX developments	
15.15-15.30	Break	Break	Break	Break	**Tutorials**
15.30-17.00	**Thierry Pellarin** Hydrology as a boundary condition for the atmosphere (TBC)	**Yinon Rudich:** Primary Biological Aerosol Particles: Climate, ice and health	**Mark Flanner** Snow and Climate	**Project rework**	
18.30	Debate: *Café des arts* **Stéphane La Branche** Debriefing of the climate game				