



e • CaIPSuL

IPSL CLIMATE GRADUATE SCHOOL (IPSL-IGS)

SPOC – Bachelor

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atmosphère

- **Solar radiation and the climate system**
Hélène Brogniez
- **The Vertical Structure of the Atmosphere**
Cyril Szopa
- **Horizontal Atmospheric Characteristics: temperature, pressure, water, wind, waves**
Philippe Bousquet
- **The Cloud Formation Process**
Marine Bonazzola
- **Physical Chemistry of Atmospheric Pollution**
Juan Cuesta
- **Vertical movements in the troposphere**
François Ravetta
- **Global numerical modelling of the atmosphere**
Camille Risi
- **Atmospheric observation networks**
Philippe Keckhut
- **Measurement of the stable isotopes of water in vapour using laser spectrometry**
Françoise Vimeux
- **Atmospheric Observation Methods**
Martial Haeffelin





- **Introductory course to the ocean and the ocean dynamics : General characteristics of the ocean**
Damien Cardinal
- **The Thermohaline Circulation**
Guillaume Gastineau
- **Subtropical Gyres**
Gilles Reverdin
- **Atmospheric circulation**
Gaëlle de Coëtlogon
- **Winter Convection – Mixed layer**
Jean-Baptiste Sallée
- **The Monsoon**
Jérôme Vialard
- **The Gulf Stream**
Damien Cardinal
- **The circumpolar current and the cyclonic gyres**
Sabrina Speich
- **Marine upwellings**
Alban Lazar
- **Biophysical coupling**
Damien Cardinal
- **Deep Convection and the Formation of Dense Waters**
Marie-Noëlle Houssais
- **Surface Ocean Circulation**
Gilles Reverdin
- **The El Niño, la Niña phenomena**
Alban Lazar

- **The Earth's Radiation Budget**
Hélène Brogniez
- **The Seasons**
Michel Capderou
- **Planetary Climates**
Aymeric Spiga
- **Climate change since the pre-industrial period**
Jean-Louis Dufresne
- **Climate Projections**
Hervé Le Treut
- **Renewable Energy and Climate Change**
Riwal Plougonven
- **Atmospheric chemistry, pollution and climate change**
Solène Turquety
- **The Carbon Cycle**
Philippe Bousquet
- **Climate variability**
Éric Guilyardi
- **Weather extremes and climate change**
Philippe Drobinski

- **History of the Earth's climate**
Gilles Ramstein
- **External Forcing of the climate: variations in the orbital parameters of the Earth (Milankovitch's theory)**
Jean-Baptiste Madeleine
- **The Last Glacial Maximum**
Amaëlle Landais
- **Climatic variability during the Holocene**
Myriam Khodri
- **Proxies - a way of studying paleoclimates**
Valérie Daux
- **Marine sediments: climate and ocean records**
● Claire Waelbroeck
- **What do we measure in ice cores?**
Jean Jouzel
- **Heinrich Events**
Sylvain Huon
- **Modelling of paleoclimates**
Masa Kageyama
- **Man and the climate: representations of Palaeolithic fauna in decorated caves**
Anne Bridault