

Progress and News

Sino-French Institute for Earth System Science (SOFIE)

In February 2012, a **first annual Winter School** was held at Peking University, Beijing, China and was attended by 50 students and 16 experts (see <https://wiki.lsce.ipsl.fr/pku/>). During the school, the Statement of Interest between PKU and the LSCE establishing the Sino-French Institute for Earth System Sciences was signed.

From April 8-11, 2013, a **second annual Spring School** was held at Peking. After the school, a workshop on the Radiative Forcing contribution of emissions of aerosols and greenhouse gases from China compared to the rest of other regions was held (joint publication in preparation).

This spring school further developed the on-going collaboration and cooperation between the two institutions and again provided training for both graduate and under-graduate students in the field of Earth System Science.

The Spring school focused on Earth System Sciences, divided into four (daily) subtopics: Global Biogeochemical Cycles, Atmospheric Composition, Future Scenarios, and Assimilation/Model Evaluation. A total of 17 lectures were given by researchers from Peking University, IPSL-LSCE and IPSL-LMD at undergrade and graduate level (see presentations at <https://wiki.lsce.ipsl.fr/pku/>)

Approximately 100 students from Peking University, Fudan University, Beijing Forestry University, the Chinese Academy of Sciences, and the Chinese Academy of Meteorological Sciences participated in the Spring school. Global modelling and regional changes as well as future scenarios were presented via lectures and video-conferencing. After each lecture, student topical presentations were made to facilitate scientific discussions and exchange.

For more information on the Sino-French Institute for Earth System Science (SOFIE) and to view Spring school presentations and background material:

<https://wiki.lsce.ipsl.fr/pku/doku.php?id=home>

中法地球科学系统研究所

2012 年 12 月，每年一次的冬季学校第一次在北京大学举行，16 位专家及 50 名学生参加 (<https://wiki.lsce.ipsl.fr/pku/>)。课程进修期间，北京大学与 LSCE 达成一致协议，注册成立了中法地球科学系统研究所。

2013 年 4 月 8 日至 11 日，第二次，春季学校（每年一次）在北京大学举行。课程结束后，相关专家举行了关于中国与其他国家和地区气溶胶和温室气体排放贡献比较的专题研讨会（合作出版物正在进行中）。

这次春季学校进一步形成了两个研究所之间继续合作的意向，将交换培养地球系统科学领域的本科生和研究生。

本次春季学校聚焦于地球系统科学，分为 4 个部分：地球生物地理化学循环、大气组成、未来情景和同化/模型估测。来自北京大学、IPSL-LSCE 和 IPSL-LMD 的专家共给研究生和本科生 17 场精彩的报告会。

来自于北京大学、复旦大学、北京林业大学、中国科学院及中国气象科学研究所的将近 100 名学生参加了春季学校。课程和视频教学包括了全球模拟、区域变化以及未来情景。每个讲座后，学生就讲座中涉及的某个话题发言，进行科学的讨论和交换意见。

更多的关于中法地球系统科学的信息或者浏览春季学校课程报告及背景资料请登录网站：
<https://wiki.lsce.ipsl.fr/pku/doku.php?id=home>。

Brief summary of the courses offered

April 8, 2013		
Speaker	Topic	Brief summary
Shilong Piao	Response of carbon cycle to temperature change progress and limits.	Presentation on how the carbon cycle respond to the temperature and why NEP is not correlated with the mean annual temperature across different forest, and there exists significant interannual variation in global carbon sink.
Matthieu Roy-Barman	Tracing the ocean carbon cycle	The ocean has a strong control on the natural and anthropic carbon cycle because it is the main carbon reservoir at the Earth's surface. Trace elements and their isotopes bring strong constrains on the carbon cycle in the vast and often inaccessible ocean.
Nicolas Vichard	Modelling forest management in global vegetation models	An overview of the today global production of bioenergy and how is currently evaluating the environmental interest of bioenergy pathways. It will also present some of the risks associated with the production of bioenergy, and possible alternatives.
Ben Poulter	(video conference) From gaps to the globe: Modeling vegetation dynamics in carbon cycle models	Vegetation dynamics are a key feature of today's global carbon cycle models and their current representation is built on over a 30-year history in forest gap modeling. As changes in vegetation patterns and process are observed at the population and landscape level, it is important to consider the advantages and limitations of modeling vegetation dynamics. This lecture will cover the background of dynamic vegetation modeling, some key assumptions, and areas of future research.
Shushi Peng	Artic changes and artic climate feedback	Introduction to the changes in temperature, precipitation, vegetation, snow cover, sea ice, glacial and ice cap etc which have been observed during the past decades over Arctic. Discussion about the important feedbacks of these changes over the Arctic on climate and the future predictions of Arctic weather.
April 9th, 2012		
Speaker	Topic	Brief summary
Yves Balkanski	Aerosol composition, optical properties and their link with climate	Review the chemical nature the role of atmospheric aerosols. The composition from pre-industrial times will be contrasted with today's composition. We will

		discuss how observational constraints are used to estimate present aerosol burden. Several example will be given of the effects of aerosols on climate..
Yi Yin	The thermal feedback of forest to local and regional climate	The general global pattern (latitudinal dependence) of partial correlation between LST and tree cover agrees with previous global model simulation or regional observations, validating our first hypothesis and allowing more detailed discussion of the mid-latitudes.
Didier Hauglustaine	Tropospheric chemistry and climate-chemistry interactions	This lectures focuses on the budget of tropospheric ozone and on the evolution of ozone under anthropogenic activities. We will review the most important species involved, their emissions into the atmosphere, the fundamentals of tropospheric chemistry and the importance of climate-chemistry feedbacks.
Philippe Bousquet	Atmospheric methane: From global to regional changes over the past 30 years	Atmospheric methane signal experienced still unexplained changes over the past 30 years. This lesson proposes an overview of our understanding of the recent methane cycle, going from global to regionals changes.
François-Marie Breon	Remote sensing of vegetation dynamic: Methods, difficulties and results	Description of methods for the remote sensing of Land surfaces, with a focus on the correction of directional effects. It also presented a few applications developed in recent years.
April 10, 2013		
Speaker	Topic	Brief summary
Pascal Yiou	Paleoclimate of the last millennium: Observations, prxies and modeling	The state of the art of climate reconstructions from proxies and model simulations. An illustration how such studies can assess climate variability of the last millennium
Philippe Ciais	Interannual variability in the terrestrial carbon cycle	Interannual variability is a « field experiment » to understand the response of the carbon cycle to short term climate variations
Tao Wang	Permafrost carbon: A vulnerable pool in a warmer climate?	A discussion based on: Snow properties, its modelling, dynamics and impacts
Jean-Louis Dufresne	(video conference) Projection of future climate change at the global scale	Three main topics were covered in the presentation (1) the physical basis of the greenhouse effect, the temperature and precipitation response to a forcing (2) the use of scenario for climate projections and (3) some aspects of climate change at global scale during this century.
Laurent Li	Modeling climate change: From global to regional	Presentation on climate downscaling from a global scale to regional one. The added value of high-resolution regional modeling is particularly visible for extreme-value statistics. Scale interaction between global and regional is another important topic, which has implication on choices of regional and global models. Finally it was emphasized that the multi-model approach is a very useful one to better describe and understand uncertainties in climate modelling.
April 11, 2013		
Speaker	Topic	Brief summary
Philippe Peylin	Data assimilation to estimate surface carbon fluxes: From	Model data fusion to improve our knowledge on the carbon cycle: from atmospheric CO2 inversion to

<p>Gregoire Broquet</p>	<p>standard atmospheric inversion to carbon cycle multi-data assimilation systems</p> <p>Estimation of natural and anthropogenic CO2 fluxes; Towards regional atmospheric inversions</p>	<p>multi-data streams assimilation. The presentation reviewed the potential of several data streams related to the land carbon cycle to optimize land ecosystem model parameters.</p> <p>The theoretical basis and some major practical aspects of the estimation of CO2 fluxes using atmospheric inverse modelling have been presented. The illustration of these concepts through the review of some global and regional applications for the estimate of CO2 natural fluxes has highlighted the need for regional inversions and some key challenges that regional inversions still require to be addressed.</p>
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Annex 1 Highlights from the SOFIE spring school



Participating professors during the spring school



Real time distance learning during last year's winter school

Annex 2 – Institutional Descriptions

The Laboratoire des Sciences du Climat et de l'Environnement (LSCE) is joint research Unit (JRU) between National center for Scientific Research (CNRS), the Atomic Energy Commission (CEA), and the University of Versailles-Saint-Quentin (UVSQ), based at Gif-sur-Yvette, France. With approximately 150 permanent staff, 40+ PhD students, and 50 postdoctoral researchers, the LSCE is leading cutting-edge research in the field of global carbon cycle, Earth system modeling, and paleoclimate reconstruction. It has taken the lead of or been involved in a number of international and EU projects, and has more than 200 scientific publications annually, published in top academic journals such as *Nature* and *Science*.

The College of Urban and Environmental Sciences at Peking University started from the establishment of the Department of Geology and Geography in 1952. The College now has five departments, two research institutes, and eight research centers covering diverse fields. The college currently consists of 90 faculty and staff members, 400 undergraduates, 530 graduates and 30 postdoctoral researchers. Members of the college pursue the excellence in research, education, and outreach in environment-related fields. Equipped with world-class research facilities and field stations, many faculty members are working towards the frontiers of environmental, ecological, and geographical sciences, and have more than 200 scientific publications annually, of which around 90 in international journals.

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