



**HAL**  
open science

## Institut Pierre Simon Laplace

Rapport Hcéres

► **To cite this version:**

Rapport d'évaluation d'une entité de recherche. Institut Pierre Simon Laplace. 2014, Université de versailles Saint-Quentin-En-Yvelines - UVSQ, Centre national de la recherche scientifique - CNRS. hceres-02034978

**HAL Id: hceres-02034978**

**<https://hal-hceres.archives-ouvertes.fr/hceres-02034978>**

Submitted on 20 Feb 2019

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



agence d'évaluation de la recherche  
et de l'enseignement supérieur

Department for the evaluation of  
research units

AERES report on unit:

Institut Pierre Simon Laplace

IPSL

Under the supervision of the following  
institutions and research bodies:

Centre National de la Recherche Scientifique - CNRS

Université Paris 6 - Pierre et Marie Curie

Université de Versailles-Saint-Quentin - UVSQ

Centre National d'Etudes Spatiales - CNES

Commissariat à l'Énergie Atomique et aux énergies  
alternatives - CEA

Institut de Recherche pour le Développement - IRD

École Normale Supérieure, École Polytechnique

Université Paris 7 - Denis-Diderot

Université Paris-Est Créteil Val de Marne - UPEC

February 2014



agence d'évaluation de la recherche  
et de l'enseignement supérieur

Department for the evaluation of  
research units

*On behalf of AERES, pursuant to the Decree  
of 3 november 2006<sup>1</sup>,*

- Mr. Didier HOUSSIN, president
- Mr. Pierre GLAUDES, head of the  
evaluation of research units department

*On behalf of the expert committee,*

- Mr. Guy BRASSEUR, chair of the  
committee

---

<sup>1</sup> The AERES President "signs [...], the evaluation reports, [...] countersigned for each department by the director concerned" (Article 9, paragraph 3 of the Decree n ° 2006-1334 of 3 November 2006, as amended).



## Evaluation report

This report is the result of the evaluation by the experts committee, the composition of which is specified below. The assessments contained herein are the expression of independent and collegial deliberation of the committee.

Unit name:	Institut Pierre Simon Laplace
Unit acronym:	IPSL
Label requested:	FR
Present no.:	
Name of Director (2013-2014):	Mr Hervé Le TREUT
Name of Project Leader (2015-2019):	Mr Hervé Le TREUT

## Expert committee members

Chair:	Mr Guy BRASSEUR, HZG, Allemagne
Experts:	Mr Sushil ATREYA, Université du Michigan, USA Mr Brice BOUDEVILLAIN, Université de Grenoble (représentant du CNAP) Mr Xavier CARTON, Université de Brest (représentant du CNU) Ms Véronique GARÇON, Toulouse (représentante du CoNRS) Mr Martin HEIMANN, Jena, Allemagne Mr John MITCHELL, Hadley Center, Grande-Bretagne

### Scientific delegate representing the AERES:

Mr Michel BLANC

### Representatives of the unit's supervising institutions and bodies:

Mr Philippe BERTRAND, CNRS  
Mr Gabriele FIONI, CEA  
Mr Stéphane JAFFARD, UPEC (excusé)  
Mr Bertrand MEYER, Université de Paris 6  
Mr Frank PACARD, École Polytechnique  
Ms Corinne ROULAND-LEFEVRE, IRD  
Mr Jean-Luc VAYSSIÈRE, UVSQ  
Mr Philippe VEYRE, CNES



## 1 • Introduction

### History and geographical location of the unit

The IPSL was founded as a “fédération de recherche” between several labs of Île-de-France acting in the areas of climate, environment and planetary science by the late Prof. Gérard MÉGIE, and directed successively by Prof. Jean JOUZEL and by Prof. Hervé LE TREUT. The IPSL is located on the campuses of its different laboratories (Guyancourt site of University Versailles-Saint-Quentin (UVSQ), Jussieu site of Université Pierre-and-Marie-Curie (Paris 6), l'Orme des Merisiers site of the CEA, campuses of École Polytechnique and École Normale Supérieure, UPEC and University Paris-Diderot sites of LISA, Bondy site of IRD). The common services of IPSL, gathering about 40 persons, are distributed between the campuses of University Pierre-and-Marie- Curie and of University Versailles-Saint-Quentin.

### Management team

The IPSL is a federation of laboratories managed by one director and four deputy-directors, with the support of one IPSL administrator. In addition, a team of approximately 40 staff members covers all functions which are shared among the laboratories of IPSL, such as for instance the communication and outreach policy.

### AERES nomenclature

ST3

### Unit workforce

We distinguish between the total workforce of IPSL and its member laboratories, described in the first two tables, and the workforce of the federal level of IPSL, described in the third table.

Total workforce (IPSL + labs)	Number as at 30/06/2013	Number as at 01/01/2015
<b>N1:</b> Permanent professors and similar positions	207	209
<b>N2:</b> Permanent researchers from institutions and similar positions	255	253
<b>N3:</b> Other permanent staff (without research duties)	358	353
<b>N4:</b> Other professors (Emeritus Professor on-contract professor, etc.)	17	21
<b>N5:</b> Other researchers from institutions (Emeritus Research Director, postdoctoral students, visitors, etc.)	216	155
<b>N6:</b> Other contractual staff (without research duties)	89	68
<b>TOTAL N1 to N6</b>	<b>1142</b>	<b>1059</b>



<b>Total workforce (IPSL + labs)</b>	<b>Number as at 30/06/2013</b>	<b>Number as at 01/01/2015</b>
Doctoral students	318	
Theses defended	293	
Postdoctoral students having spent at least 12 months in the unit	158	
Number of Research Supervisor Qualifications (HDR) taken	61	
Qualified research supervisors (with an HDR) or similar positions	270	

Workforce of the Federation

<b>Total IPSL federation workforce</b>	<b>Number as at 30/06/2013</b>	<b>Number as at 01/01/2015</b>
<b>N1:</b> Permanent professors and similar positions	2	2
<b>N2:</b> Permanent researchers and similar positions	2	2
<b>N3:</b> Other permanent staff (without research duties)	24	24
<b>N4:</b> Other professors		
<b>N5:</b> Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.)	6	6
<b>N6:</b> Other contractual staff (without research duties)	7	7
<b>TOTAL N1 to N6</b>	<b>41</b>	<b>41</b>



## 2 • Assessment of the unit

### Strengths and opportunities related to the context.

The Institute Pierre-Simon-Laplace (IPSL), initiated by Prof. Gérard MÉGIE more than 20 years ago, directed by Prof. Jean JOUZEL from 2001 to 2008, and now under the directorship of Prof. Hervé LE TREUT is a unique federation of 6 (now 9) research laboratories located in the region of Île-de-France and focusing on different aspects of Earth and Planetary Systems science. IPSL integrates knowledge developed by the different laboratories, initiates and coordinates new interdisciplinary activities, and disseminates information to different stakeholders.

The Panel was impressed by the breadth of the research conducted by IPSL and by its different entities. This federation has clearly influenced the research scene in France. It has put climate and planetary science conducted in France at the forefront of international research, has provided considerable visibility to French scientists and a stronger international recognition of the quality of the work performed in the different laboratories.

### Weaknesses and threats related to the context

The Panel has noticed, however, that the support and recognition provided by the sponsor institutions (acting as funding agencies) was rather weak. These governing bodies seem to recognize the importance and benefits of IPSL in the French research environment, but their scientific vision for the future of this federation as a whole or the financial support for the required joint infrastructure to further develop are lacking. In most European countries where climate science is recognized as a priority, dedicated infrastructures (specialized supercomputing facility, smaller post-processing systems, logical support, databases, common building or joint campus) have been gradually developed and financed. Rather than noting efforts to consolidate the necessary federation of key laboratories through IPSL, the Panel has observed a fragmentation and dispersion of efforts, for example, through the creation of new entities such as the Observatoires des Sciences de l'Univers (OSU), which, in Paris, are linked to several universities. This might ultimately be detrimental to the IPSL federation efficiency and cohesion.

### Recommendations

The Panel recommends that the governing bodies identify ways to reinforce the federation of the IPSL laboratories, identify swiftly financial resources to improve the research infrastructure and provide a clearer recognition to the important role played by IPSL on the French research scene.



## 3 • Detailed assessments

### Assessment of scientific quality and outputs

*The committee did not make any detailed assessment of the accomplishments of IPSL member laboratories, as they are the subject of separate visit reports by the AERES.*

The Panel was very impressed by the quality and breadth of the research conducted in the different scientific entities under IPSL. In many areas, IPSL is at the forefront and has acquired a very high international reputation. This is the case, for example, for planetary research, which is of very high quality, or for the questions related to cloud-climate feedbacks and paleoclimate for which IPSL has played a leadership role.

We provide below a synthetic review of the IPSL research activities and formulate some recommendations. The Panel did not have the opportunity to review all aspects of the research conducted in each individual IPSL entity, and therefore emphasizes the larger strategic issues.

### Solar System

The Solar System Pole (SSP) of IPSL has highly visible expertise and research programs in planetary dynamics, chemistry and space plasma physics amongst others. To a large extent these revolve around modeling, spacecraft observations and lab work to understand current processes in planetary and satellite atmospheres. The next step is to try and pull all this information together to understand the origin and evolution of planetary atmospheres and climates. This will be central also to gain an insight into the formation of exoplanets including potential habitable exoplanets. Following are a few recommendations for SSP to move in that direction, by exploiting existing expertise within IPSL with infusion of some additional expertise from other institutions in the Paris area in particular and France in general.

#### *Specific Recommendations*

1. Adopt a Systems approach. The goal should be to treat the planets as a system, where interior, surface, atmosphere and the magnetosphere are coupled.
2. Planetary geology and geochemistry are two components that need strengthening within SSP in the context of solid planet and satellite systems approach.
3. Biogeochemistry is another area that is potentially an important extension of SSP activities in the context of origin of life on our planet and elsewhere, especially as relevant planetary measurements in which SSP is involved begin to emerge.
4. Help develop scenarios for future evolution of earth's climate, considering that SSP is in a unique position to do this by drawing analogies from evolution of climates of Venus and Mars. This will also lead to stronger links between the climate and planets pôles of IPSL.

### Earth System

#### *Climate Research*

IPSL has been instrumental in ensuring that the high quality of climate research in the Paris and Ile-de-France area is integrated to increase the impact at national and international levels. IPSL is conducting world-class work, for example, in ocean modeling, paleoclimate, cloud feedbacks and biogeochemical cycles. The combination of modeling and observational studies is another particular strength.

In particular, the greater integration fostered by IPSL has led to a much higher profile in the 5<sup>th</sup> IPCC (Intergovernmental Panel on Climate Change) assessment. Much of this is due to the work in developing and maintaining climate models and running experiments for the wider community, and setting up and maintaining the extensive data bank which has enabled a much wider community to contribute to analysis and publication of results.





## ***Earth System Modeling (Global and Regional)***

IPSL, by bringing together expertise from its different entities, has done a superb job in developing a fully coupled Earth system model. However a clear strategy on the scientific problems that will be tackled by using this comprehensive tool to address, for example questions related to the interactions between climate and biogeochemical (carbon, nitrogen...) cycles, impacts of climate change on land processes, impacts of climate change on air pollution, role of urbanization or agriculture on the earth system, etc. still needs to be formulated.

Regional climate modeling is a rather new activity, which is also very important. Here again, a strategy needs to be established to define the regions that will be under study, to design methods for the regional studies to feedback on the global modeling simulations. Several avenues could be followed: 1) Embedding regional models in global models in such a way that there is a two-way coupling between the regional and global models, or 2) Designing regional studies (which for example, might include very high resolution modelling studies of field campaigns) to improve the representation of physical processes in models, including global models.

Ultimately, the approach towards global and regional modeling should be unified. Here again, a long-term strategy needs to be developed, in particular as IPSL is developing a new dynamical core for its models.

## ***Biogeochemistry***

The model components describing the biogeochemical cycles of the land surface and the ocean developed and improved by IPSL are among the best currently available in the world. This model is perfectly suited to make important advances in areas related to biosphere/atmosphere and climate/carbon interactions. The Panel did not hear, however, an articulated strategy about future objectives in this area. Some interesting topics for the future were listed, including, for example, studies of estuaries but no hierarchy of the top priorities was presented. Here, models based on finite element methods are usually adopted, but it is unclear if the expertise for such methods exists in house or must involve the participation of experienced groups outside IPSL. Furthermore, although IPSL research laboratories are centrally involved in setting up a regional/global biogeochemical observing system with important contributions *e.g.* to ICOS, IGCO, GCP and others, a more stringent strategy has to be developed on how these observational data streams are to be used and assimilated into the core IPSL climate model for its improvement. Finally, land and also ocean biogeochemistry are increasingly affected by many direct and indirect anthropogenic impacts. Even though the socio-economic drivers are not the focus of IPSL's research strategy, the implications of these impacts for the future functioning of biogeochemical cycles need to be taken into account in the modeling system and should be included in the mid-term research strategy.

## ***Atmospheric Chemistry***

IPSL has a strong capability in areas related to tropospheric and stratospheric chemistry. This capability, however, remains fragmented in different IPSL entities, and should be consolidated around a few challenging scientific themes. Here again, the strategy for the future is unclear. IPSL should perhaps develop an atmospheric chemistry "pole" (or focus) that would combine process (laboratory) studies, *in situ* observations, space observations and global/regional modelling. The development of an atmospheric service as part of the EU Copernicus Programme offers an excellent opportunity to play a long-term scientific/research role in support of a new operational activity.

## ***Observational Activities***

Although IPSL is no longer itself an "OSU", observation and process studies should keep a prominent place in its activities. In particular, the federation should continue to develop a strategic view in this area and promote logistical support (maintenance, databases) and funding for these activities. Logistical free support should be provided to the Equipment of Excellence projects that have been granted to its entities. It is therefore important that IPSL continues to position itself in observational activities such as those conducted by SIRTa, at the level of "SOERE" (federations of observation services). Continuity of funding for observation services that are partially or not covered by INSU funding is essential, notably for international network services. Finally, IPSL should continue to play a key role in space-related science activities. It is therefore important that the federation, together with its entities, define a clear space policy around a few exciting Earth and planetary themes.



### Assessment of the unit's academic reputation and appeal

IPSL certainly belongs to the league of the world's most prominent research institutions on climate, atmospheric, planetary and related sciences. Its strong participation in the various IPCC activities and in research projects sponsored by the World Climate Research Programme (WCRP) as well as solar system exploration missions of ESA and NASA provide clear signs that the research conducted by IPSL is of the highest quality.

The Panel notes the partial confusion that exists in the international community regarding the corporate identity of IPSL since scientists have a double affiliation: IPSL and an individual member institute.

### Assessment of the unit's interaction with the social, economic and cultural environment (Societal Relevance)

The science conducted at IPSL, particularly on issues related to climate and its impacts or related to air quality, is extremely relevant to society. The Panel agrees with the IPSL management that the focus of the federation should remain on "hard science", in which it has excelled. However, the Panel believes that the scientific environment and the funding landscape are rapidly evolving and, because of the relevance of climate science, that a dialogue with stakeholders should be initiated to identify the questions that IPSL could address. Further, there should be concerted efforts to better disseminate and explain the results of the research. The Panel believes that the interface between "hard science" (IPSL) and "softer sciences" (social science, economics), which are relevant for Earth sciences, should be clarified and probably intensified. The development of a climate service function in IPSL may be a way to achieve this objective. Stronger links with some adequate university departments, and the participation and positioning in the new Future Earth Programme may be additional avenues.

### Assessment of the unit's organisation and life (Management)

The administration and management of IPSL are evolving, in particular due to the broader membership by additional entities that recently joined IPSL. The Panel welcomes the addition of these new entities and believes that their participation will strengthen IPSL. The Panel also believes that the management structure of IPSL needs to be clarified, specifically regarding the role and responsibilities of the deputy Director. It is also important to create the conditions for the Director of IPSL to fully play his role as the ambassador of the entire federation to the external world, and specifically to the governing bodies. Finally, the Panel has learned that the administrative support needed for coordinating the activities of 1200 staff members is insufficient. It suggests that a few of the administrative staff members operating in the IPSL entities be "detached" to the central IPSL office. If well conceived, this would provide a certain economy of scales, while reinforcing the federation of the tasks in IPSL. Finally, the amount of space available and the quality of the IPSL offices must be improved.

### Assessment of the unit's involvement in training through research

The plans developed by IPSL for education and capacity training are excellent and impressive. The Labex offers opportunities for such development. The website associated to these activities seems appealing and well conceived. Maybe opportunities to teach Ethics in Science to students should also be considered. The Panel was particularly happy to hear that IPSL is considering developing a Master for journalists in issues related to Earth Sciences. This initiative offers additional possibilities to reinforce links with society.

### Assessment of the strategy and the five-year plan

During the site visit of the Panel, the Director of IPSL has presented the vision of the federation for the next 5 years. This vision includes many interesting aspects, and the federation should be congratulated for being a catalyst to discuss future activities to be developed through joint initiatives between the different entities.

It was not always clear, however, in which new areas IPSL planned to lead the way in the longer term. The group felt it was important for IPSL to think strategically about what new areas they wanted to move into, and not just "go with the crowd". In the longer term, IPSL should consider use the same model framework for global and high-resolution studies to ensure improvements in the model at one scale are easily passed on to other scales.



The Panel believes that IPSL has reached a cross-road: it has established itself as a scientific leader in the world, has contributed to many international initiatives or projects including, for example, IPCC's activities. Time is ripe to think more fundamentally about a new scientific life for the federation with the development of new concepts and perhaps some risky research topics. The federation should think beyond the "IPCC era" and increasingly focus on innovative initiatives dealing for example with process studies, unresolved questions about Earth system dynamics, coupling and feedback mechanisms, interface of physics, chemistry, biology and social sciences. New mechanisms in IPSL to bring new ideas from the bottom to the top should be established. The Panel realizes that this is a challenge, but it recommends that in the coming year, IPSL takes the time to think about innovative topics that are perhaps "out of the box" and gets prepared for the science that extends beyond the present IPCC framework.



## 4 • Conduct of the visit

### Visit dates:

**Start:** February 3<sup>rd</sup>, 2014 at 09.00 am

**End:** February 4<sup>th</sup>, 2014, at 5.00 pm

**Visit site:** Site of OVSQ and LATMOS at Guyancourt

**Institution:** Université de Versailles Saint-Quentin

**Address:** Guyancourt

**Second site:** Site of Université de Paris 6 at Jussieu

**Institution:** UPMC (Paris 6)

**Address:** Jussieu Campus, Paris

**Specific premises visited:** SIRTA at École Polytechnique (Site Instrumental de Recherche par Télédétection Atmosphérique), and Computer Center at UPMC

### Conduct or programme of visit:

#### Monday 3 February

(in Guyancourt, site of the Observatory of Versailles-St-Quentin, amphithéâtre Gérard Mégie)

*9.30-10.00 am:* Welcoming the IPSL visiting committee

*10.00-10.30 am:* Closed meeting of the committee with the AERES scientific delegate

*10.30-10.40 am:* Introduction to the meeting by the AERES scientific delegate

*10.40-11.20 am:* Introduction: Overall view of IPSL, its context and main accomplishments and general perspective (Mr Hervé LE TREUT)

*11.20-11.35 am:* The Labex: Scientific Perspectives (Mr Robert VAUTARD)

*11.45- 1h00 pm:* The main scientific themes structuring IPSL illustrated through a few selected achievements (1 selected achievement for each theme, 15 minutes for each theme, 10 minutes Biomar)

Understanding and predicting climate changes and fluctuations (Mr Jean-Louis DUFRESNE)

Modeling the Earth System (Ms Marie-Alice FOUJOLS)

Regional Climates (Mr Philippe DROBINSKI)

The solar system (Mr François FORGET)

Instrumental Research and Spatial Strategy (Ms Nicole PAPINEAU)

Biomar (Ms Marina LEVY)

*1.00-2.00 pm:* On-site Lunch



- 2.30-3.30 pm: IPSL thematics: illustration of new perspectives
- The ESPRI project
  - Paleoclimates (Mr Franck BASSINOT)
  - Air composition and chemistry (Ms Cathy CLERBAUX)
  - Biochemical cycles (Mr Laurent BOPP)
- 3.30-4.30 pm: Meeting with the governing bodies of IPSL
- 4.30-5.00 pm: Coffee break
- 5.00 pm: Bus transfer to Paris with a stop at École Polytechnique to visit the SIRTA
- Presentation of the SIRTA (Mr Martial HAEFFELIN) + Presentation on the projects concerning observations (Mr Philippe KECKHUT)

## Tuesday 4 February

(in University Pierre and Marie Curie, Council Meeting Room, Tour Zamansky, 23<sup>rd</sup> Floor)

- 9.00-9.15 am: Welcome coffee
- 9.15-10.00 am: IPSL: The project for the next years
- 10.00- 10.20 am: Perspectives associated with the emergence of climate services (Ms Nicole PAPINEAU/Mr Robert VAUTARD)
- 10.20-10.40 am: IPSL and educational issues (Mr Philippe BOUSQUET)
- 10.40-12.15 pm: The AERES committee meets successively with:
- The "comité de direction" of IPSL
  - The representatives of the IPSL staff
- 12.30-1.00 pm: *Visit of the computer centre, futher discussions with the IPSL staff*
- 1.00-1.00 pm: Lunch
- 2.00-2.30: Meeting with the IPSL direction
- 2.30-4.00 pm: Closed deliberations
- 4.00 pm: end of the visiting committee



## 5 • Supervising bodies' general comments



Versailles, le mardi 27 mai 2014

Le président de l'Université de Versailles  
Saint-Quentin-en-Yvelines

à

*Dossier suivi par  
Christian Delporte, Vice-Président du conseil  
Scientifique chargé de la recherche et du  
développement scientifique  
Réf : JLV/CD/MC/DREDDVal 14-204*

Monsieur Didier Houssin  
Président  
Agence dévaluation de la Recherche et de  
l'enseignement supérieur  
20 rue Vivienne - 75002 PARIS

Réf. : [S2SF150008350 - INSTITUT PIERRE SIMON LAPLACE - 0781944P](#)

Objet : Evaluation des unités de recherche

Monsieur le Président,

Nous avons pris connaissance avec le plus grand intérêt du rapport de l'AERES concernant l'Institut Pierre Simon Laplace porté par Monsieur Hervé Le Treut.

Nous remercions l'AERES et le comité pour l'efficacité et la qualité du travail d'analyse des experts. Le directeur de la fédération de recherche, avec le soutien de ses tutelles, ne manquera pas de mettre en œuvre leurs recommandations constructives pour la période quinquennale 2015-2019.

Nous vous adressons ci-joint les observations et commentaires du porteur de ce projet formulés au regard du rapport de l'AERES

Nous vous prions de croire, Monsieur le Président, à l'expression de nos cordiales salutations.

Jean-Luc Vayssière  
Professeur des universités

UNIVERSITÉ DE  
VERSAILLES  
ST-QUENTIN-EN-YVELINES



Guyancourt, Le 26 mai 2014

## Réponse de la direction de l'IPSL au rapport de son Comité d'Evaluation de l'AERES

(Mai 2014)

La direction de l'IPSL remercie le Comité de Visite pour son travail approfondi, et pour son écoute attentive des acteurs rencontrés : personnels, directions de laboratoire, responsables de projets.

Elle se réjouit que le Comité ait exprimé une appréciation globalement très positive de l'action de l'IPSL, et de son rôle important et reconnu dans le paysage national et international. Cette appréciation récompense le travail de beaucoup de personnes impliquées depuis longtemps dans cette démarche collective.

La direction de l'IPSL laisse bien sûr ses différentes tutelles répondre aux remarques qui leur sont destinées. Il est important de noter qu'au cours des dernières années, le niveau de support de certains des établissements qui ont appuyé de manière forte le développement de l'IPSL, a varié de manière importante, en fonction de contraintes extérieures. Cependant, ces fluctuations et la complexité notable des structures de la recherche sur le climat en région parisienne, n'ont pas empêché le développement de l'IPSL au cours des dernières années : ce développement reflète des enjeux de recherche importants, le travail collectif que s'efforce d'assurer l'IPSL s'impose comme une nécessité, et il s'est toujours trouvé soutenu de manière directe ou indirecte. Mais ces difficultés conjoncturelles et cette complexité structurelle posent effectivement un problème de continuité des actions (exercices internationaux de modélisation, participation à des réseaux ou campagnes d'observation, à des missions spatiales...), ainsi qu'une difficulté à se projeter de manière originale et à long terme dans le paysage international, comme cela a été relevé par le Comité.

La direction de l'IPSL a bien noté les pistes de développement suggérées par le Comité. Elles viennent de fait parfois soutenir des actions déjà entreprises, ou déjà débattues dans le cadre des réunions prospectives préparatoires à l'évaluation. Ces actions ont peut-être été décrites de manière un peu trop allusive lors de l'évaluation elle-même, dans les présentations orales en particulier.

Ainsi articuler au mieux les recherches climatiques aux échelles globales et régionales constitue un souci majeur de l'IPSL (soutien qui a aussi dirigé la création du Labex IPSL). Il s'est accompagné de développements techniques que nous n'avons pas toujours soulignés : l'imbrication des modèles régionaux dans les modèles globaux avec des techniques permettant les interactions dans les deux



sens (« double nesting ») est une réalité. Nous avons aussi proposé au cours de cet exercice de prospective la mise en place d'actions coordonnées sur les climats du passé, sur la chimie atmosphérique, sur les cycles biogéochimiques. Nous avons également très fortement remanié l'organisation des études observationnelles et instrumentales avec la création d'un « Pôle Observations » chargé de les coordonner en fonction d'axes scientifiques directeurs. L'identification de ces axes scientifique constituera un enjeu majeur de ce Pôle et de la recherche à l'IPSL, puisqu'elle déterminera les domaines dans lesquelles l'IPSL pourra appliquer avec le plus de force sa capacité à lier l'analyse de modèles et de données d'observation d'origines très diverses.

Concernant le rôle plus large de l'IPSL en lien avec les débats sociétaux qui entourent la question du climat, elle pose un problème dont nous pouvons juste ici rappeler les tenants et les aboutissants. D'un côté ces enjeux s'inscrivent comme un complément naturel de l'action de l'IPSL, et beaucoup des chercheurs de l'IPSL sont impliqués dans des démarches de ce type, soutenues par la Fédération ou le Labex L-IPSL. D'un autre côté ces approches font appel à un jeu d'acteurs très riche qui ne peut pas se développer de manière interne à l'IPSL, mais met en jeu de manière importante et légitime d'autres structures (le GIS CES, les OSU, d'autres laboratoires académiques...). L'IPSL est en tout cas décidé à jouer son rôle dans le développement de « Services Climatiques » qui doivent constituer l'un des moteurs de ce lien entre recherches climatiques et société.

Enfin la direction de l'IPSL relève avec plaisir l'intérêt du Comité pour son action dans les domaines de la formation et de l'information, qui ont été renforcés par la mise en place du Labex. Le Labex a également permis une politique plus forte dans les domaines de l'innovation (instrumentale en particulier) et du transfert d'expertise vers les sociétés privées.



Hervé Le Treut  
Directeur de l'IPSL