

PLANETOLOGY

DEVELOPMENTS OF DATA ARCHIVING, TOOLS AND SERVICES IN FRANCE

Alain Sarkissian



PARIS

AT IPSL: LMD, SA, LISA, CETP

At OBSPM: VO-PARIS, LESIA, IMCCE

At CEA: SAp

And also: IAS, IAP, IPGP, IDES ...

FRANCE

CDS (Strasbourg), LAM (Marseille)
Institut Carnot de Bourgogne (Dijon)

UTINAM (Besançon Observatory)
Laboratoire de Planétologie (Grenoble)
PALMS (Rennes), LPMA (Reims)
CESR (Toulouse), LPCE (Orléans)

- 20 Labs with data base related to planetology
- All recent space experiments data bases are represented
- Also simulation and laboratory data in support to planetary missions
- Also tools, web services, standard definition working groups, bibliography, name resolver, etc...

This presentation = a general overview of these activities

At IPSL

IPSL: Institut Pierre-Simon Laplace includes SA, LMD, LISA and CETP laboratories developing space experiments and atmospheric models related to planetary atmospheres.



ATMOSPHERE



At Service d'Aéronomie (SA)

IDIS Atmosphere Node

Coordinators: Alain Sarkissian and Eric Chassefière (SA)

3 Science Cases

60 experts, 12 countries, 20 labs

Access: <http://idis.ipsl.jussieu.fr>

The Planetary Atmosphere Node of EUROPLANET



Home

SC 2.1: Titan Ion Chemistry

- . Data
- . Databases
- . Models and models outputs
- . Experts
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SC 2.2: Spectro of CH4

- . Data
- . Experts
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SC 2.3 : Spicam + GCM

- . Data
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SC 2.4 : Super-Rotation

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Introduction to the thematic nodes of IDIS

This website is dedicated to the thematic field of Atmosphere as part of the Integrated and Distributed Information Service (IDIS) developed during the EUROPlaNet Project. In General the IDIS System is divided into four thematic nodes and one technical top node.

The EuroPlaNet IDIS thematic science node "Atmosphere" is hosted by the **Centre de données of the Institut Pierre Simon Laplace (IPSL)** and is established in close cooperation with the **Service d'Aéronomie**.

The four EuroPlaNet IDIS thematic science nodes (Planetary Surfaces and Interiors, Atmospheres, Plasma Science and Small Bodies) are dedicated to open a web window to the status of solar system research and provide an effective information management system for scientists and interested persons about solar system knowledge, databases and scientific tools.

The main aim of the Atmosphere node will be to:

- support collaborative work in the field of Atmosphere
- provide information about data bases and scientific tools in this field
- establish an scientific information management
- define and develop Science Cases regarding IDIS

Actually the specific **science cases** related to Atmosphere are under construction:



- **Science case 2.1 : Titan Ion Chemistry**
- **Science case 2.2 : Spectro of CH4**
- **Science case 2.3 : Spicam + GCM**
- **Science case 2.4 : Super-Rotation**

Contact addresses for this IDIS node:

IPSL, Service d'Aéronomie
Route des Gatines, BP3
F-91371 Verrières-le-Buisson, France
Alain Sarkissian, (Alain.Sarkissian(at)aerov.jussieu.fr)
Eric Chassefiere, (Eric.Chassefiere(at)aerov.jussieu.fr)

IDIS N7 Atmosphere Node

IDIS Science Case

Titan Ion-Neutral chemistry

Leader : Pascal Pernot, LCP, Orsay, France

Co-leaders: Odile Dutuit LPG, Grenoble, France

Sébastien Lebonnois LMD, IPSL, France

Node coordinators: Alain Sarkissian SA, IPSL, France

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SC 2.2: Spectro of CH4

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SC 2.3 : Spicam + GCM

- [. Data](#)
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SC 2.4 : Super-Rotation**Links****News****Credits**

Science Case 2.1 : Databases

- **GAPHYOR**

- **Content:** Bibliographical database on the Properties of Atoms, Molecules, Gases and Plasmas, including Chemical Reactions
- **Creator(s):** LPGP, Univ. Paris-Sud, Orsay, France
- **Comments:**
- **References:**
- **Medium:** Database interface
- **Simplified form:**
Enter formula with all elements counts (ex: C1H4 for CH₄) and charge ("+", "-" or nothing)

Formula: Charge:

- **AMBDAS: Atomic and Molecular Bibliographical Database**

- **Content:** Atomic and Molecular Bibliographical Database
- **Creator(s):** International Atomic Energy Agency, Nuclear Data Section/Atomic and Molecular Data Unit, Vienna, Austria
- **Comments:**
- **References:**
- **Medium:** Database interface



- **OSU chemical database**

- **Content:**
- **Creator(s):** Eric Herbst (Columbus University, Ohio, USA), updates by Valentine Wakelam (LAB, Univ. Bordeaux I, France) and Eric Herbst
- **Comments:** Uncertainties are being introduced
- **References:** Lee, Bettend & Herbst (1996, A&AS 119, 111); Smith, Herbst & Chang (2005, MNRAS 350, 323)
- **Medium:** ".csv" file

- **UDFA: UMIST Database for Astrochemistry**

- **Content:**
- **Creator(s):** T. Millar (Queen's University Belfast, UK) since 1995
- **Comments:** No uncertainties
- **References:** Millar, Farquhar & Willacy (1997, A&AS 121, 139); Le Teuff, Millar & Markwick (2000, A&A 146, 157)
- **Medium:** Database interface / ".csv" file

- **Electron Impact Cross Sections (NIST)**

N7 : Integrated and Distributed Information Service (IDIS)

ATMOSPHERE


Europlanet
IDIS Top Node
EUROVO
BDAP
IPSL
Service d'Aeronomie
APACHE
PSS

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SC 2.3 : Spicam + GCM

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SC 2.4 : Super-Rotation

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Science Case 2.1 : Bibliography

Bibliography related to SC 2.1

- **Bibliography related to SC 2.1**


Bibliography of Experts

<ul style="list-style-type: none"> ■ Pascal Pernot (LCP) ■ Christian Alcaraz (LCP) ■ Roland Thissen (LPG) ■ Odile Dutuit (LPG) ■ Jean Lilensten (LPG) ■ Michel Dobrijevic (LAB) ■ Nathalie Carrasco (IPSL) ■ Sébastien Lebonnois (IPSL) ■ André Canosa (PALMS) ■ Sébastien Le Picard (IPR) ■ Daniela Ascenzi (Univ. Trento) ■ Paolo Tosi (Univ. Trento) 	<ul style="list-style-type: none"> ■ Zdenek Herman (Heyrovsky Institute) ■ Marek Baraszkiwicz (SRC) ■ Ingo Müller-Wodarg (Imperial College) ■ Marina Galand(Imperial College) ■ Wolf Geppert (Stockholm Univ.) ■ Detlef Schröder (AVCR) ■ Jana Rolfova (AVCR) ■ Véronique Vuitton (Univ. Tucson) ■ Roger Yelle (Univ. Tucson) ■ Jan Zabka (Heyrovsky Institute)
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At SA

<http://bdap.ipsl.jussieu.fr> : Portal for data and tools related to planetary atmospheres at IPSL.

<http://bdap.ipsl.jussieu.fr/>



The banner features a central image of a reddish planet with white clouds, set against a background of a starry space with a bright sun on the right. The text 'BDAP' is prominently displayed in white on the planet, with 'Base de données des atmosphères planétaires' written below it in smaller white text. To the right of the planet, there is a vertical list of four menu items, each preceded by a small orange circle: 'Nouveautés', 'Accès aux données', 'Bibliographie', and 'Découvrir le site'. At the top left of the banner, there are three small flags: the United Kingdom, France, and the United States. At the bottom of the banner, there is a row of green text listing various institutions: 'LESIA | LISA | LMD/CNRS | SA | CNES | ESA | INSU | PNP'. Below the banner, there is a footer line with the text: 'INSTITUT PIERRE SIMON LAPLACE © 2007 bdap.ipsl.jussieu.fr est un site de CENTRE DE DONNÉES DE L'IPSL POLE DE PLANÉTOLOGIE'.

LESIA | LISA | LMD/CNRS | SA | CNES | ESA | INSU | PNP

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PROGRA² data base

E. Hadamcik (Service d'Aéronomie)

- **PR**opriétés **O**ptiques des **GR**ains **A**stronomiques et **A**tmosphériques
- Measurements of light scattering on parabolic flights (**A300 of CNES**)
- A lot of phase functions since 1994 (particles physical properties)
- **LPCE (Orléans) and Service d'Aéronomie (Verrières-le-Buisson)**
- Data to be stored at **ICARE** at Université de Lille (www-icare.univ-lille1.fr)

At LISA

<http://www.lisa.univ-paris12.fr/GPCOS/SCOOPweb/lesmoleculesdeSCOOP.htm>



Titan's spectroscopic database

Molecules		Spectral domain	
		Mid-UV	IR
Hydrocarbons			
C_2H_2	<i>Acetylene</i>		
CH_3C_2H	<i>Methylacetylene</i>		
CH_2CCH_2	<i>Allene</i>		
CH_2CHCCH	<i>Vynilacetylene</i>		
Polyynes			
C_4H_2	<i>Diacétylène</i>		
C_6H_2	<i>Triacétylène</i>		

At LMD

Mars: <http://johnson.lmd.jussieu.fr:8080/las/servlets/dataset>

The screenshot shows the Mars Climate DataBase website. At the top, there is a header with a Mars landscape image and the title "Mars Climate DataBase" in yellow. To the right of the title is a search bar with the text "Search:" and a "Go" button. Below the header is a navigation menu on the left with options: "single data set", "compare two", "Datasets", "Variables", "Constraints", "Output", "Output Options", "Previous Outputs", "Define variable", "Documentation", and "LAS Homepage LAS UI Version 6.2.1". The main content area is titled "Datasets" and contains the text "Select a dataset to continue or click on ⓘ (where available) for related informations." with a "Help" button. Below this is a section for "Related documentation:" with three links: "About dust and solar scenarios", "Informations on solar longitude Ls", and "About vertical coordinates". The "Select dataset:" section lists eight scenarios: 1 - Martian Year 24 dust and average solar flux scenario (ADVISED), 2 - Martian Year 24 dust and minimum solar flux scenario, 3 - Martian Year 24 dust and maximum solar flux scenario, 4 - Dust storm and average solar flux scenario, 5 - Dust storm and minimum solar flux scenario, 6 - Dust storm and maximum solar flux scenario, 7 - Warm scenario (dusty, with maximum solar flux), and 8 - Cold scenario (clear, with minimum solar flux). At the bottom, there is a footer with logos for LMD/CNRS, Open University, University of Oxford, CNRS, and ESA.

At LMD

Titan : <http://web.lmd.jussieu.fr/titanDbase/>

GCM TITAN DATABASE

Institut Pierre-Simon Laplace

- Laboratoire de Meteorologie Dynamique, Jussieu, Paris, France
- Service d'Aeronomie, Verrieres-le-Buisson, France

Project developed by:

Pascal RANNOU pra@aero.jussieu.fr

Frédéric HOURDIN hourdin@lmd.jussieu.fr

Sébastien LEBONNOIS Sebastien.Lebonnois@lmd.jussieu.fr

David LUZ luz@despace.obspm.fr

We have developed in the last decade a two dimensional version of the LMD Titan General Circulation Model. This model accounts for multiple coupling occurring on Titan between dynamics, haze, chemistry and radiative transfer. It was successful at explaining many observed features related to atmosphere state (wind, temperature), haze structure and chemical species distributions. An important step in our knowledge about Titan has now been taken with the Cassini mission and Huygens descent on Titan. In this context, we want to make the results of our model available for the scientific community which is involved in the study of Titan. Such a tool should also be useful for interpreting ground based telescope observations.

Our results are presented here as an atmospheric database, in an ASCII file database.wrk (around 28 Mo).

To use it, two methods are proposed:

- Use the Fortran routines ready to read the database
- Get and install the Graphical User Interface (GUI) package

But first, you may want to get and read the User's Guide.

These files are available below. Up-to-date versions are:

- User's Guide: online january 17, 2006.
- database: 1.5, online end november 2007
- GUI: 1.0, online end december 2005

USER'S GUIDE

In pdf format: [users_guide.pdf](#)

In postscript format: [users_guide.ps](#)

DOWNLOAD THE DATABASE

At OBSPM
VO-PARIS DATA CENTRE
Marie-Lise Dubernet and William Thuillot

The screenshot shows the homepage of the Virtual Observatory Paris Data Centre. The header features the logo on the left and the title 'Observatoire de Paris - Meudon - Nançay' on the right. A navigation bar includes links for 'Tools', 'Mailing lists', 'Contact us', and 'Intranet'. A left sidebar contains a menu with sections: 'ABOUT' (VO-Paris, News, Events calendar, Departments, Missions / Instruments, Partners), 'THEMATICS' (Fundamental Astronomy, Planetary Systems, Sun, Stars and Galaxies, High Energy Physics, Simulation and Theory, Atoms and Molecules for Astrophysics), 'WORKING GROUPS' (VO-GAFF, VO-Planeto, VO-Theory, VO-Grid, VO-Workflow), and 'DATA AND SERVICES' (Databases). The main content area has a section titled 'The VO Paris Data Centre' with two paragraphs of text. Below this is a 'Latest News' section with a 'More News...' link.

Observatoire de Paris - Meudon - Nançay

Virtual Observatory
Paris Data Centre

[Tools](#) [Mailing lists](#) [Contact us](#) [Intranet](#)

ABOUT

- [VO-Paris](#)
- [News](#)
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- [Planetary Systems >](#)
- [Sun](#)
- [Stars and Galaxies](#)
- [High Energy Physics](#)
- [Simulation and Theory](#)
- [Atoms and Molecules for Astrophysics](#)

WORKING GROUPS

- [VO-GAFF](#)
- [VO-Planeto](#)
- [VO-Theory](#)
- [VO-Grid](#)
- [VO-Workflow](#)

DATA AND SERVICES

- [Databases](#)

The VO Paris Data Centre

The Paris VO Data Centre project aims at providing VO access to its databases resources, at participating to international standards developments, at implementing VO compliant simulation codes, data visualization and analysis softwares.

The various activities are organised into portals whose functions are to provide visibility and information on the projects and to encourage collaboration.

Paris VO Data Centre offers a central support to the various projects through central storage and web servers computing facilities. On images, spectra and numerical simulations, Paris VO Data Centre plays a role in training through tutorials and seminars.

Latest News

[More News...](#)

Observatoire de Paris - Meudon - Nançay

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 Atoms and Molecules for Astrophysics

WORKING GROUPS
 VO-GAFF
 VO-Planeto
 VO-Theory
 VO-Grid
 VO-Workflow

DATA AND SERVICES
 Databases
 Services

OUTREACH

VO-Planeto

VO-Planeto Working Group

The arrival of the space data from Mars-Express, Cassini-Huygens, Venus-Express and then BEPI-COLOMBO, militates for a national action in favour of the filling and the valorization of the space data. The CNES and the INSU wish to set up planetary data bases on a national scale. In preoccupations with a centralization of the VO-planeto activities in Paris area, The Virtual Observatory part of our activities was developed in the framework of VO-Paris Data Centre. Planetology, very late in the field of valorization and the setting with data layout compared to other fields of astronomy, has the real desire to be invested much more. It is in this objective that we have set up the Vo-Planeto Working Group which met for the first time in December 2006 (20 participants) and a second in December 2007 (30 participants), to allow to the members community: (i) to make knowledge with the VO (for some of them); (ii) to identify together our needs; (iii) to make an inventory of the state of art; and (iv) to clarify our relationships to our national and international authorities such as the CNES, VO-France, Europlanet, ESA, and IPDA, which took an active part in these meetings.

This working group is now well established in Europlanet, IPDA, and of course in the IVOA. We studied the various standards and formats used in planetology, mainly FITS, PDS (and PSA), SPASE and NetCDF and their possible extension in the form of a VO (or equivalent VO). Since its creation; the working group actively take part in the development of tools and standard for the VO for what concerns the planetology area.

[Contact](#)

© 2008 - VO-Paris Data Centre

<http://vo-web.obspm.fr/>
 at VO-Paris Data Centre

(OBSPM) Virtual Observatory activities

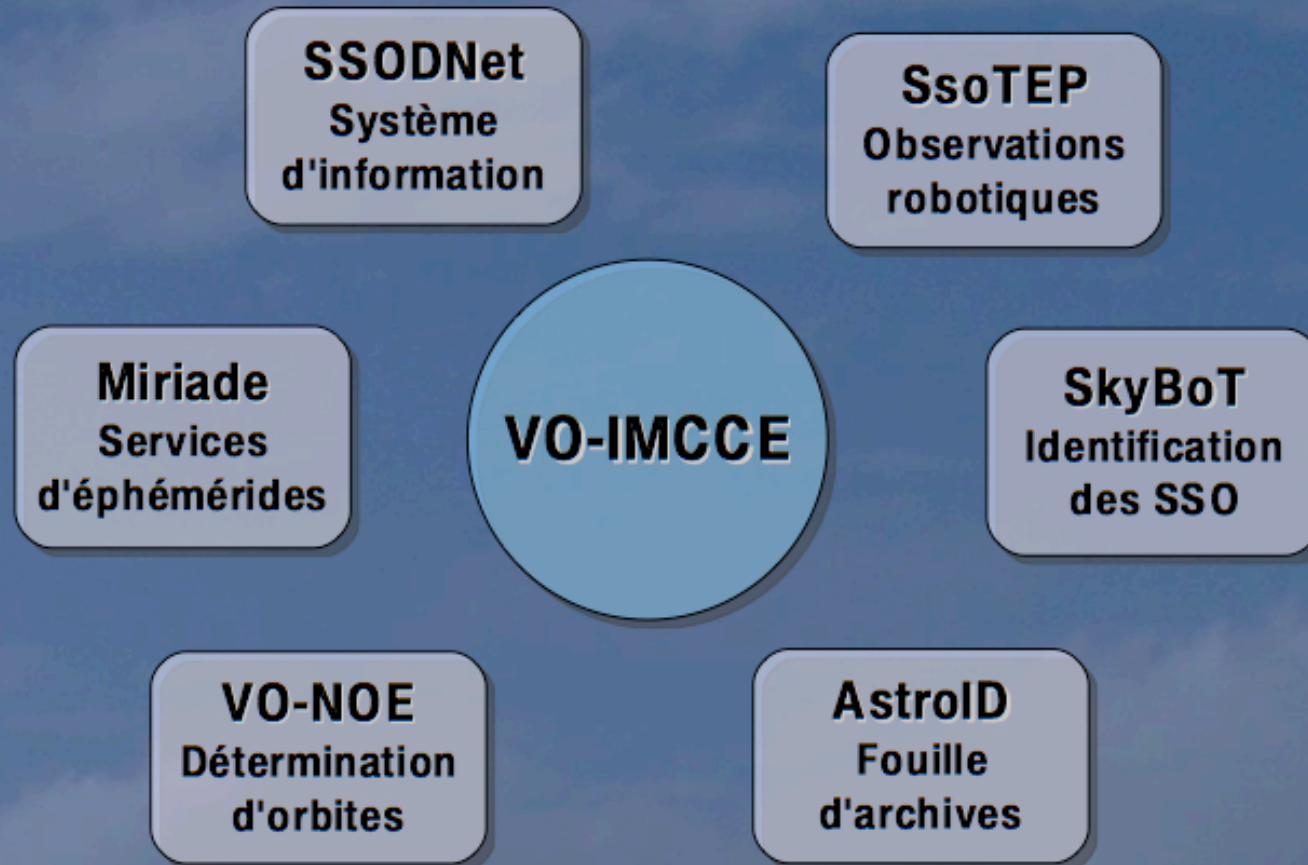
Definition of standards, Data Model, Interoperability and VO tools for planetology

Outils & Services VO de l'IMCCE



J. Berthier, W. Thuillot, F. Vachier, V. Lainey

IMCCE - Observatoire de Paris - CNRS, France
(berthier@imcce.fr)



Tools for planetology, including atmosphere (occultations)

LESIA

_ **Cometary Data Base :**

- radical OH, observations RT/Nançay since 1973 (Jacques Crovisier)
- **project** : molecular observations at millimetric wavelength (HCN, CO, CS, ...)
(Dominique Bockelee-Morvan)

_ **Molecular Data Base** (Jacques Crovisier)

IR and radio, *<http://www.lesia.obspm.fr/~crovisier/basemole/>*

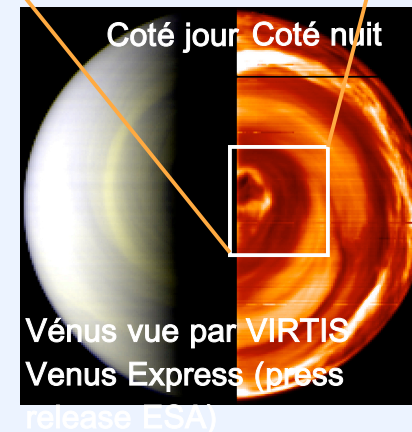
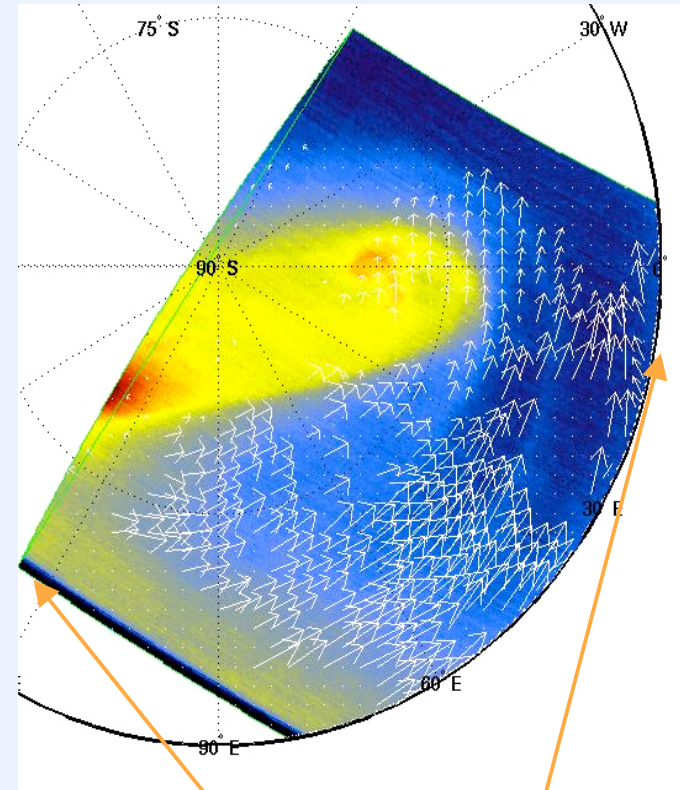
_ **Project data base for planetary atmospheres :**

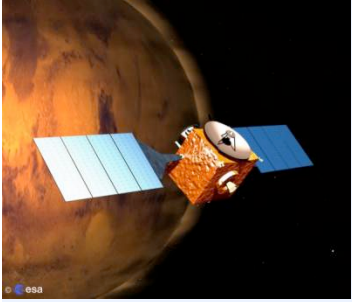
- *Venus* : wind profiles from Venus Express (David Luz)
- *Titan* : Temperature profiles and aerosol from Cassini/CIRS

The Dynamics of Venus atmosphere with Venus Express

Cartography of the dynamics VIRTIS data analysis (PI P. Drossart - LESIA):

- Development and use of automated procedure to follow a tracer on VIRTIS images for **wind determination**;
- Wind fields in 2D at cloud basis (1.7, 2.3 mm) and at 60 km (5.0 mm)
- Combinaison of wind measurements and temperature fields (thermic winds) on night side of the planet (60-90 km).





IAS

Centre de données spatiales
des surfaces planétaires :
Expérience MEx/OMEGA

*Institut d'Astrophysique Spatiale
Université Paris-Sud*

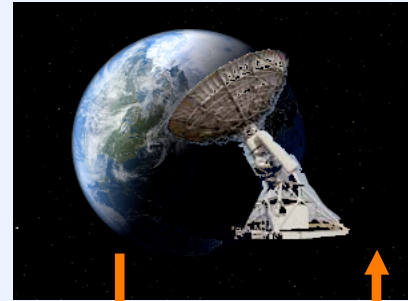
François Poulet, J.-P. Bibring (PI)
N. Roche (CDD CNES), G. Poulleau (responsable IDOC),
Y. Langevin, B. Gondet, M. Berthé

operational and data processing

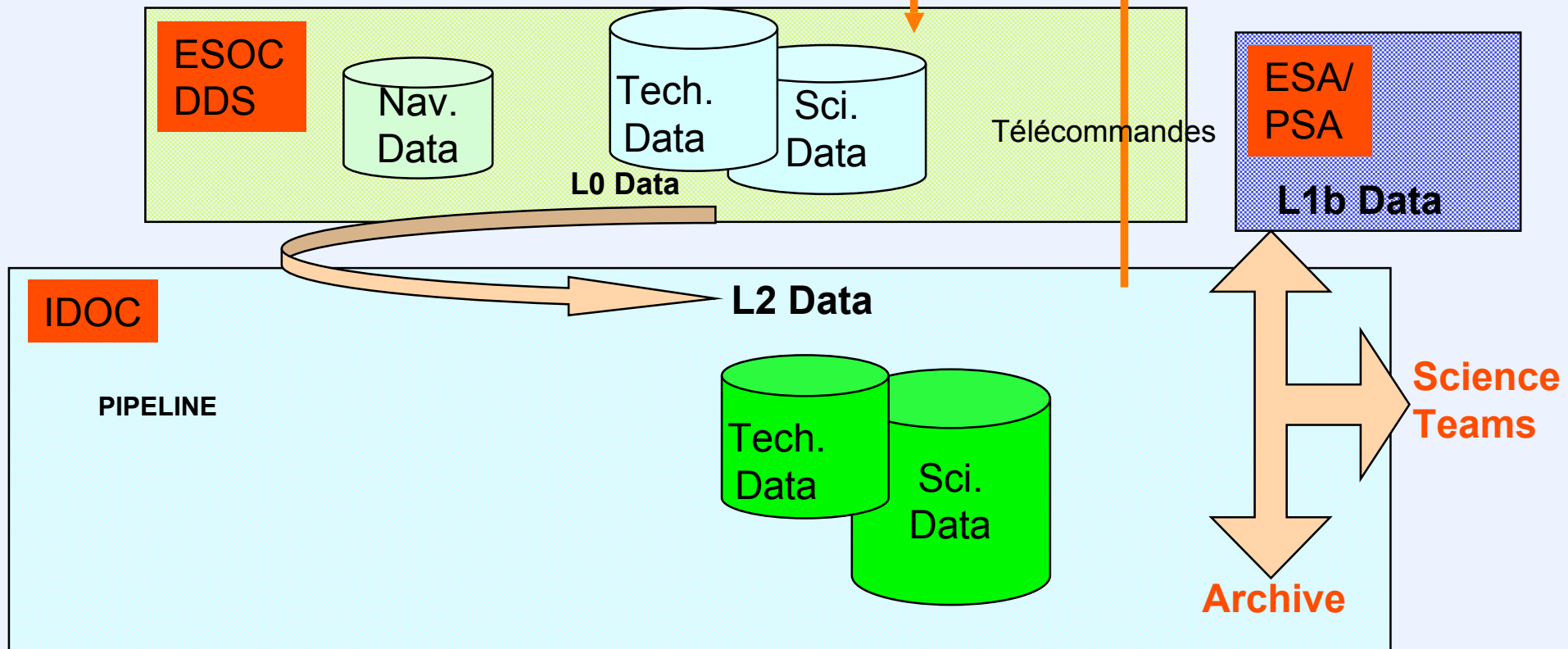


Omega (2003 =>2007+) :
- 1000 observations
- 250 Go

HRSC : Images associated 2 To



+ NASA/MRO/CRISM





OV-France > [Main](#) >
WebHome

OV-France webs:
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Action Spécifique Observatoires Virtuels France AS OV France / France VO [Inscrivez-vous sur la liste de diffusion](#)



	<p>CALENDRIER DES REUNIONS LIEES A L'AS OV 23-27 juin 2008: EuroVO-DCA Workshop on how to publish data in the VO, Garching 7-11 avril 2008: Theory in the Virtual Observatory/Grid and the Virtual Observatory, Garching 4 mars 2008: Groupe de travail Théorie, réunion de travail sur SNAP, Lyon Le projet Euro-VO Astronomical Infrastructure for Data Access (EuroVO-AIDA) a commencé le 1er février 2008 Recensement des centres de données européens, Date limite: 1er février 2008 - il est encore possible d'envoyer de l'information ASOV France: Appel d'Offre 2008, Date limite: 15 janvier 2008 13 décembre 2007: Atelier OV-Planéto, Jussieu 5 décembre 2008: Journée Briques logicielles, Observatoire de Paris 26-27 novembre 2007 à Paris : Réunion générale annuelle de l'ASOV Le projet Euro-VO Data Centre Alliance a commencé le premier septembre 2006 ...autres nouvelles et annonces / ... other news and announcements</p>	

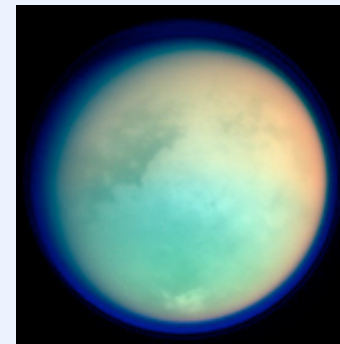
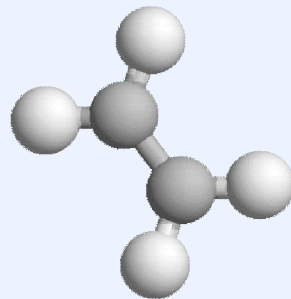
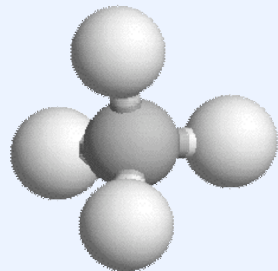
Les rubriques du TWiki OV France	Contenu	
L'action Spécifique OV France	Conseil Scientifique, charte, ...	Changements Chercher RSS
Cas Scientifiques	Exemples d'utilisations scientifiques de l'OV	Changements Chercher RSS
Groupes de travail	Les groupes de travail de l'OV France	Changements Chercher RSS
Journées spécifiques	Programme, présentation, ...	Changements Chercher RSS
Exposés	Exposés OV France, exposés aux réunions Interopérabilité	Changements Chercher RSS
Réunions	Comptes-rendu, prochaines dates, ...	Changements Chercher RSS

VO-France: The French Virtual Observatory initiative, supported by INSU and CNES, cover several disciplines: astronomy, planetology, solar-terrestrial relations, astrophysics. It is a member of the International Virtual Observatory Alliance (IVOA) which is at present focused on the astronomical Virtual Observatory.

Programmes and spectroscopic data base
at Institut Carnot de Bourgogne (Dijon)
XTDS & SPVIEW : computations and spectral analysis
Spectroscopy of methane (CH₄)
Spectroscopy of ethylene (C₂H₄)

Vincent BOUDON, Christian WENGER, Maud ROTGER, Tony
GABARD, Jean-Paul CHAMPION, Michel Loëte

*Institut Carnot de Bourgogne – UMR 5209 CNRS-Université de Bourgogne, 9 Av. A. Savary, BP 47870, F-21078 DIJON,
France*



Data Base for Spectroscopy of Solids

Bernard SCHMITT

and Pierre Volcke

Laboratoire Planétologie de Grenoble

For the analysis of spectroscopic observation and for ground-based, in situ or space based spectro-imaging, and for cosmo-material studies in laboratories

- **Visible-far IR Spectroscopy by transmission**
(spectra, optical constants, vibrational modes and frequencies)
- **Visible-IR Spectroscopy of surfaces by reflexion bidirectionnal**
(bidirectional spectra, reflectance functions and diffusion parametres...)
- **Micro-spectrometry Raman and Fluorescence (excitation UV/vis)**
- **Spectro-imaging by infrared microscopy**

***Bases de données planétologiques à
l'Observatoire de Besançon***

Philippe Rousselot

Observatoire de Besançon / UTINAM

***Actually two data bases for planetology
related to Kuiper objects***

An orbital data base

Photometric data base

Atelier "Valorisation des données en Planétologie"
6 Décembre 2006
Observatoire de Paris – France



Réactivité Chimique de C_2 et C_4H en phase gazeuse à très basses températures: application aux atmosphères de Titan et des Planètes Géantes

André CANOSA