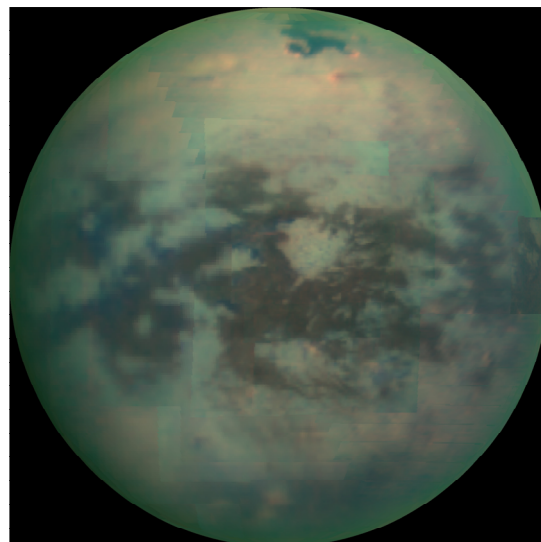
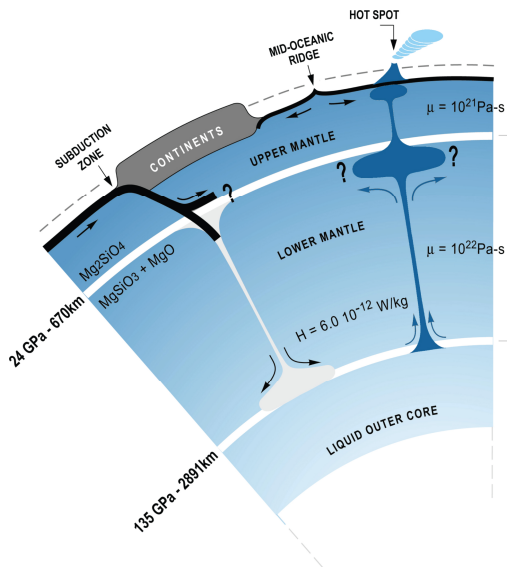


# Resume

Christophe Sotin

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Sketch of the interior structure of the Earth (Sotin et al., 2010)

Titan seen by the Visual and Infrared Mapping Spectrometer (April 2010)

## Curriculum vitae

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Pasadena, CA, 91109  
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E-mail : [christophe.sotin@jpl.nasa.gov](mailto:christophe.sotin@jpl.nasa.gov)

Married, 3 children

date of birth: 12/23/1958,  
place of birth: Nantes, France

**Present Position :** Senior Research Scientist at the Jet Propulsion Laboratory, California  
Institute of Technology (Pasadena, CA).

### Professional record

Principal Research Scientist at JPL/Caltech since September 2007  
Senior Research Scientist since December 2007  
Professor at University of Nantes since 1993 – Professor ‘classe exceptionnelle’ since 2005.  
Distinguished visiting scientist at JPL since January 2005  
Visiting professor at Brown University (RI, U.S.A.) in 2001  
Professor at Institut Universitaire de France from 1996 to 2001  
Professor at Paris XI University (Orsay) from 1988 to 1993.  
Research assistant at Brown University from 1986 to 1988.  
Assistant professor at University of Nantes from 1985 to 1986.  
Research assistant at Institut de Physique du Globe de Paris from 1983 to 1985.  
Volontaire Aide Technique (VAT) at Observatoire de Guadeloupe from 1981 to 1982.

### Education

11/86: Docteur d'Etat ès Sciences at Paris VII University  
09/83: Ph.D. in Geophysics at Institut de Physique du Globe de Paris  
06/81: D.E.A. (Master degree in Science) in Geophysics at Nancy University  
06/81: Master Degree in Geological Engineering from Ecole Nationale Supérieure de Géologie (ENSG)

### Honors

Medal ‘Runcorn-Florensky’ of the European Union of Geosciences (2008)  
Chevalier dans l’ordre des Palmes Académiques (Janvier 2007)  
Member of IAA (International Academy of Astronautics) since 2003  
Member of ‘Bureau des Longitudes’ since January 2001  
Member of ‘Institut Universitaire de France’ from 1996 to 2001  
NASA Group Achievement Awards:  
2009 – Cassini Titan Orbiter Science Team (TOST)  
2009 – Visual and Infrared Mapping Spectrometer (VIMS) Team  
2004 – Aerial Regional-scale Environmental Survey of Mars (ARES) Mission  
Concept Development Team

### Participation at different committees and other duties

#### At NASA

Member of the Science Definition Team of the EJSM (2009-2010).

Member of the Science Definition Team of the TSSM (Titan and Saturn System Mission), 2008.

Member of the Mars Architecture Tiger Team, 2008.

Member of a NASA panel for the selection of missions using ASRG, 2008.

Member of the Science Advisory Group for the definition of the 2016 Mars mission, 2007.

Member of a NASA panel for the selection of instruments on a mission, 2001.

External reviewer for different NASA programs since 2000.

#### At the French Space Agency (CNES)

Member of the Science Advisory Committee between November 2000 and January 2009.

Chairman of CNES Solar System Working Group between 1997 and 2000.

#### At the French National Research Council

Member of the National Program 'Origine des planètes et de la vie' 2007-2010.

Director of 'Laboratoire de Planétologie et Géodynamique de Nantes' between January 2004 and December 2007.

Member of the Astrophysics Science Committee (section 17, CNRS) between September 2004 and September 2007.

Member of GdR Exobiology between 2002 and 2008.

Member of the Science Advisory group for 'Programme National de Planétologie' between 1998 and 2006.

Director of the national program 'Study of the Earth's Deep Interior' between 2000 to 2002.

Member of several evaluation committees for laboratories in Earth Science and Astrophysics.

#### Miscellaneous

Member of the Advisory committee of Institut d'Astrophysique Spatial

Editors of special issues of Planetary and Space Science related to workshops on Mars in 2000, 2004 and 2005.

Organizer of several exhibits about planetary exploration for the public

Members of several hiring committees in different universities

Reviewer for journals such as Nature, Science, Icarus, JGR, GRL, PSS, ....

.....

#### **Convener of special sessions in meetings and organization of meetings and workshop**

Member of the Local Organizing Committee of the joint DPS-EPSC (Division of Planetary Science (US) and European Planetary Science Conference) to be held in October 2011 in Nantes

Co-chair of a Mars workshop for the International Space Science Institute in Bern (2011)

Co-convener of two sessions at the 2010 Fall AGU:

U14: Union session on 'Innovative approaches in planetary seismology'(convener are C. Sotin and D. Stevenson)

P11: Titan: hydrocarbon cycle and oxygenated reactions (convener are C. Alexander, R. Lopes, R. Nelson, C. Sotin)

Member of the Science Organizing Committee of the Exeter Exoplanet Workshop, Exeter, UK, September 7-10, 2010.

Member of the Science Organizing Committee of the Venus Express workshop, Aussois, France, June 20-26, 2010.

Co-chair of the Mars III workshop, Les Houches, France, 03/28-04/02 2010.  
 Co-chair of the Keck Institute for Space Science (KISS) workshop entitled ‘Innovative approaches in planetary seismology’ – March 2010, Caltech.  
 Co-chair of three sessions at the 2009 Fall AGU:  
   P23E: Physics and Chemistry of Ices: From the laboratory to the planetary scale  
   P42B: Modeling Planetary Dynamics  
   P54C: Titan and lakes: Geography, Limnology and Astrobiological Potential  
 Co-organizer of the first ‘Super-Earths’ workshop, Nantes, June 2008  
 Organizer of the Titan’s surface workshop, ESTEC, February 2007.  
 Convener of session ‘Titan’ at the 1st Europlanet Science Conference, September 2006.  
 Organizer of the Cassini-Huygens PSG meeting in Nantes in June 2006.  
 Organizer of the session entitled ‘Planetary Science’ at the SF2A meeting, Strasbourg, 27 June to 1 July 2005.  
 Organizer of the workshop ‘Planet Mars’, les Houches, 23 May to 1 June 2005.  
 Organizer of the workshop entitled ‘A comparative study of the outer planets before the exploration of Saturn by Cassini-Huygens’, ISSI (International Space Science Institute), Berne, 12-16 January 2004.  
 Organizer of the European workshop ‘Planet Mars’, les Houches, 30 April - 9 May 2003.  
 Co-convener of session ‘Early Earth’, EGS, April 2003.  
 Organizer of the workshop on Planetary Science in France, Nantes, 10-12 September 2002.  
 Convener of the meeting “Mars exploration and other sample return missions”, Paris, February 2-7 1999.  
 Organizer of the workshop “The Jovian system after Galileo, the saturnian system before Cassini-Huygens”, Nantes (France), May 11-15 1998.

.....

**Role in space missions**

Interdisciplinary Scientist (IDS) on ESA VenusExpress mission since June 2006.  
 Co-I of MERMAG on the ESA Bepi-Colombo mission since 2006.  
 Co-I of OMEGA on the ESA MarsExpress mission (2000 - )  
 Team-member of VIMS on the NASA Cassini mission (1993 - 2017)  
 Co-I of ISM on the Soviet mission PHOBOS (1988-1989).

## **Work and duties related to space exploration**

I came to Nantes in 1993 in order to set up a laboratory in planetary geophysics because the most recent data in planetary science and the experiments onboard upcoming missions to Mars and other planets require more and more interaction between Earth Science and Planetary Science. I am involved in implementing the observations of and processing the data of mapping spectrometers VIMS/Cassini and OMEGA/Mars Express. I have worked on a number of projects including airplanes for Mars, Mars geophysical networks, Bepi-Colombo (Mercury), Corot (extra-solar planets) and future missions to Europa and Titan. I am a Co-Investigator on Cassini, Mars-Express and Bepi-Colombo. In June 2006, I got appointed as one of the 5 IdSs (Interdisciplinary scientist) on the ESA Mission Venus-Express.

During the last 15 years, I have studied the internal dynamics of the Earth and other Earth-like planets including Mars and the large icy satellites of the outer planets. The models are used to predict the thermal history of the planets and to compare with observations such as chemical composition of the surface, magnetic field, gravity field and seismic activity. The comparison between observations and models allows for a better understanding of the physical processes which drive the evolution of each planet. One major goal is to understand the uniqueness of planet Earth. My future work will deal with the interaction between internal dynamics and evolution and composition of planetary atmospheres.

I have served in a number of committees including the advisory committee of the French space agency (chairman of the solar system working group from 1997 to 2001), the CNRS program 'Interieur de la Terre' (director between 2000 and 2003), and NASA panels. I have organized several workshops and conferences including the Euroconference entitled "The Jovian system after Galileo, the Saturnian system before Cassini-Huygens", held in Nantes (France) in May 1998 and was the chairman of the meeting entitled "Mars exploration and other sample return missions" held in Paris in February 1999. I also organized several exhibits on solar exploration for the public. I was Co-I on the ISM experiment onboard the Phobos mission in 1989 and I am Team Member of the VIMS experiment onboard the Cassini spacecraft.

I am the PI (Principal Investigator) of a Discovery proposal entitled JET (Journey to Enceladus and Titan) which was submitted to NASA in September 2010. I am the US lead in the Cosmic Vision M3 proposal entitled TAE (Titan Aerial Explorer) submitted to ESA in December 2010.

I have authored or co-authored more than 140 papers in refereed journals and books. Several papers describe the internal structure (presence of deep oceans) of icy satellites, and the internal dynamics of the Earth, terrestrial planets, icy satellites, large asteroids (Ceres), and extrasolar planets.

## Work related to exoplanets

### Publications

- Sotin, C.**, Jackson J.M., Seager S. (2010) Terrestrial planet interiors; in Exoplanets, S. Seager (Ed), University of Arizona Space Science Series, 375-395.
- Grasset, O., Schneider, J., and **Sotin, C.** (2009) A study of the accuracy of mass-radius relationships for silicate-rich and ice-rich planets up to 100 Earth; *Astro. J.*, 693, 722-733.
- Sotin C.**, Grasset O and Mocquet A; (2007); Mass-radius curve for extrasolar Earth-like planets and ocean planets; *Icarus*, 191, 337-351.
- Selsis F, Chazelas B, Borde P, Ollivier M., Brachet F., Decaudin M., Bouchy F., Ehrenreich D., Griessmeier, J. -M., Lammer H., **Sotin C.**, Grasset O., Moutou C., Barge P., Deleuil M., Mawet D., Despois D., Kasting J. F., Leger A. (2007); Could we identify hot ocean-planets with CoRoT, Kepler and Doppler velocimetry?; *Icarus*, 191, 453-468.
- Léger A., Selsis F., **Sotin C.**, Guillot T., Despois D., Mawet D., Ollivier M., Labèque F.A., Valette C., Brachet, Chazelas B., Lammer H., (2004), A new family of planets ? « Ocean planets », *Icarus*, 169, 499-503.

### Invited talks and communications

- Sotin C.**, Ocean Worlds; Conference on “Exoplanets Rising: Astronomy and Planetary Science at the Crossroads”, KITP/UCSB, March 2010.
- Sotin C.**, Thermal convection and plate tectonics on Earth-like exoplanets ; UC Santa Barbara, February 2010.
- Sotin C.**, Mini-Neptunes and Super-Earths: can we make the difference; Kavli Institute for Theoretical Physics, UCSB, February 2010.
- Sotin C.**, Methane in Exoplanets: Lessons from Mars and Titan, workshop on “Exchange processes in icy moons”, International Space Science Institute, Bern, Switzerland, November 2008.
- Sotin C.**, Extrapolating solid Earth models to terrestrial exoplanets; JPL, April 2008.
- Sotin C.**, Titan’s geology: comparison with icy satellites and earth-like planets; Caltech, April 2008.
- Sotin C.**, Extrapolating solid Earth models to terrestrial exoplanets; University of Arizona, April 2008.
- Sotin C.**, 2004, Ocean in the solar system and beyond, Darmstadt, Germany, 2 Novembre 2004.
- Sotin C.**, 2004, Water in the solar system and beyond, Jet Propulsion Laboratory and Caltech, Pasadena, 4 Mai 2004.
- Sotin C.**, 2004, Water in the solar system and beyond, Geotop conference at McGill university and université du québec à Montréal (UQAM), Montréal, 2 Avril 2004

### Chapter on the internal structure of terrestrial exoplanets

The science committee of the first book on Exoplanets in the series of the University of Arizona boos asked me to write the chapter on the interior structure of Exoplanets (Sotin, C., Jackson J.M., Seager S., Terrestrial planet interiors, University of Arizona Space Science Series,)

### Member of the Science Advisory Committee of the first ‘Super-Earths’ workshop in Nantes, 16-18 June, 2008

About 100 people attended this first workshop on Super-Earths. During the three days, there has been a lot of discussion among the participants. This workshop was interdisciplinary with the participation of astronomers, astrophysicists, planetary scientists and geologists.

## Teaching experience

**2009** – I have completed the writing of a book in Planetary Science for undergraduate students. **Sotin C.**, O.Grasset and G. Tobie, Planétologie, Dunod, 350 pp.

**2009** – Class on exoplanets for graduate students (J. Schubert and C. Sotin), UCLA.

**1998-2007** - The table below gives the list of classes I taught when I was professor in Nantes (only years from 1998 are reported). The usual teaching load is 200 hours per year. But my teaching load was reduced due to my duties for the French research council (CNRS) and the University of Nantes (1998-2001 and 2004-2007), and for my role in the Cassini mission (2004-2007)

	Number of hours					
	98/99*	99/00*	00/01*	01/02	02/03	03/04
Introduction to geosciences for undergraduates		6		54	66	60
Astrophysics for undergraduates	54	57	36	42	45	45
Field work in geophysics				16		
Geodynamics for graduate students	40	34	39	82	79	81

	Number of hours				
	02/03	03/04	04/05	05/06	06/07
Introduction to geosciences for undergraduates	66	60	60	60	40
Mathematics for geologists - undergraduates					34
Astrophysics for undergraduates	45	45			17
Geodynamics for graduate students	79	81			20

I had the responsibility of the following classes:

- Introduction to geosciences for undergraduates : 450 students in 2004/2005, 500 in 2005/2006, 600 en 2006/2007.
- Astrophysics for undergraduates: about 100 students
- Energy : 70 students / I worked out the syllabus of this class but a colleague taught it because I could not do it.
- Geodynamics for graduate students, 10 students.

**1993-1998** – 192 hours per year

### Advisor for the following Ph.D. thesis

#### Encadrement de thèses :

1. Bruno Allard, 1988, Application de l'analyse d'images à la détermination de la composition modale sur lames minces, Université de Montpellier, Ingénieur France Télécom.

2. Philippe Blondel, 1992, Analyse d'images radar : application à la tectonique de Vénus, Ingénieur océanographe à l'université de Southampton.
3. Laure Dupeyrat, Convection chimique et thermique : applications à la Terre et Vénus. MdC Université de Paris XI.
4. Olivier Grasset, Professeur à l'université de Nantes.
5. Pierre Vacher, MdC université de Nantes.
6. Frédéric Deschamps, , chercheur à l'université d'Utrecht puis chercheur à l'ETH Zurich depuis Septembre 2005.
7. Stéphane Labrosse, MdC à l'Institut de Physique du Globe de Paris puis professeur à Lyon depuis le 01/09/06.
8. Gaël Choblet, 01/10/95 au 10/01/99, Dynamique interne des planètes : apport de la modélisation 3D, CR2 CNRS depuis Octobre 2002.
9. Julie Castillo, 01/10/98 au 05/12/2001, Contribution à l'étude de la structure interne des planètes telluriques. Postdoc au Jet Propulsion Laboratory (JPL) 2002/2007 puis Research Scientist au JPL depuis 2007.
10. Olivier Mousis, 01/10/98 au 01/12/2001, Rôle des hydrates dans la formation de Titan et des satellites de glace réguliers, ATER en Physique à l'université de Besançon, Postdoc à l'université de Berne, MdC Besançon depuis Septembre 2004, HDR en 2006.
11. Véronique Dubois, 01/10/98 au 09/09/02, Relations masse-rayon-composition pour des planètes extrasolaires de type terrestre. Emploi dans l'animation culturelle à Nantes.
12. Gabriel Tobie, 01/10/2000 au 27/10/2003, Chauffage de marée et géodynamique des satellites des planètes géantes. Post-doc University of Arizona at Tucson (bourse Lavoisier 2003/2004), puis au LPGNantes (bourse CNES) 2004/2006. CR CNRS au LPGNantes depuis Novembre 2006.
13. Judith Pargamin, 01/10/2000 au 08/07/04, Etude thermodynamique et expérimentale des clathrates et des mélanges H<sub>2</sub>O-NH<sub>3</sub>-CH<sub>4</sub> : applications planétologiques. Réorientation en journalisme scientifique (DESS en 2004/2005), reçue au concours de conservateur du patrimoine en option patrimoine scientifique et naturel en Novembre 2006.
14. Jean-Philippe Combe, 01/10/2001 au 24/10/05: télédétection IR des surfaces planétaires. ATER à l'Université de Nantes puis postdoc au Planetary Science Institute (PSI) à Winthrop (WA, USA).depuis le 01/02/06. Research Scientist au PSI depuis le 01/02/08.
15. Yoann Quesnel, 01/10/2003 au 20/11/06: Analyse des données géophysiques de Mars, postdoc à Potsdam (Allemagne) du 01/12/2006 au 30/09/2008. Maitre de conférences au CEREGE (Aix-Marseille) depuis 1 Octobre 2008.
16. François Couturier, 01/10/2003 au 26/04/2007\*: Convection 3D sphérique et champ de gravité, ATER à Paris7 du 01/10/2006 au 30/04/2007 puis à partir du 01/05/2007 poste CDI d'animateur en astronomie (employé par l'association 'A Ciel Ouvert', Moulin du roi, av Pierre De Coubertin 32500 FLEURANCE). \*Date de soutenance reportée en Avril 2007 du fait de problèmes de réunion du jury de thèse.
17. Laetitia LeDeit, 01/10/2005 au 30/11/2008 : Géologie de Mars d'après les données Mars-Express. Postdoc at DLR (Berlin) depuis 12/2008.
18. Lucille LeCorre, 01/12/2006 au 03/12/2009: Géologie de Titan à partir des données de spectro-imagerie infrarouge et radar de la mission Cassini. Postoc au

département « Space and Climate Physics » à University College London (UCL) depuis 12/2009.

**Devenir des étudiants en thèse au 1/1/2010 :** 2 postdocs, 3 dans la valorisation de la recherche, 2 ingénieurs dans le privé, 4 MdC, 5 chercheurs dont trois à l'étranger (ETH Zurich, JPL, PSI), 2 professeurs.

**Outreach activities since 1998**

Conferences and seminars for the public (see list in the list of publications)

Publications in journals that describe scientific discoveries to the public (The New Scientist, Science et Vie, La Recherche, ...)

Participations at radio and TV interviews including Discovery Channel and National Geographic.

Participation at the realization of exhibits for the public

Mars : Exploration d'une planète, 2005/2007, Muséum d'Histoire Naturelle de Nantes jusqu'au 21 Août 2006, puis à Tours à partir du 18 Septembre 2006.

Foire Internationale de Nantes, Avril 2005

Les météorites, 2001, Muséum d'histoire naturelle de Nantes.

Chroniques terrestres, 2000-2004, exposition itinérante de la MCLA, stand géologie planétaire.

Les mondes inventés, 2000, Château des Ducs de Bretagne, Nantes

Exploration du système solaire, 1999, Libreville, Gabon.

Exploration du système solaire, 1998, Cité des congrès, Nantes.

Talks in elementary schools, high-schools, children hospitals, etc...

## **Activities at JPL (September 2007 – December 2010)**

### **Team-member of the Cassini/VIMS**

Since I arrived at JPL, I have been responsible for the VIMS observations on Titan. These observations have concerned mainly the present extended mission (2008-2010). It gives me some training on how to deal with the day-to-day operations. With one flyby per month (and sometimes every 16 days), the number of operations is quite large and the sequencing is a heavy load.

My work also includes data processing and interpretation of the VIMS images. Last results include the determination of methane and ethane in lacus Ontario on Titan (Nature, July 2008). Several studies are ongoing on geological features that are seen at Titan's surface.

### **Development of a laboratory experiment on the interaction between hydrocarbons and water ice under Titan conditions**

I have set up a chamber where Titan conditions can be met ( $T=94$  K,  $N_2$  Pressure). The objective is to study the interaction between hydrocarbons and  $H_2O$  ice. We have been able to obtain drops of methane and ethane dropping in the ice and forming an hydrocarbon pools. The data (videos, temperature, pressure) are being analyzed and implications for the composition of Titan surface will be discussed in a paper we are preparing. The chamber is being modified to allow Raman observations to be performed

Other experiments include the cycling loading of  $H_2O$  and  $CH_4$  ices in order to constrain models of tidal dissipation in the icy crust of the icy moons.

### **Co-I on the following proposals**

- NASA Astrobiology Institute 'Titan'
- NASA Astrobiology Insitute 'Icy worlds'
- NASA Outer Planet Research 'Cyclic Loading of ices'
- NASA Outer Planet Research 'Thermal conductivity of planetary ices'

### **Member of the Science Definition Team (SDT) for the Titan and Saturn System Mission (TSSM) during 2008.**

My role in this SDT includes:

- Attending the meeting with the engineers for asking about the feasibility of the montgolfière in Titan's atmosphere – fluid mechanics for the calculation of the buoyancy / proving information about Titan / definition of the science investigations to be performed on the balloon
- The responsibility of the traceability matrix for each in situ element (lake-lander and the montgolfiere)
- Being the scientist in charge of defining the requirements for the determination of the gravity field and the topography from the orbiter – other members of the SDT have helped on that issue
- Helping the coordination between JPL – ESA and CNES
- Writing the part of the proposal defining how the extension of the Cassini mission can set the stage for TSSM (landing sites, seasonal variations, long term variability, ...)

**Member of the Science Definition Team (SDT) for the Europa and Jupiter System Mission (EJSM) – (2009-2010)**

My role in this SDT includes:

- Definition of the synergy between the NASA-led Europa orbiter and the ESA-led Ganymede orbiter.
- Assessment of a Europa lander
- Helping the coordination between JPL/NASA and ESTEC

**Writing of several book chapters**

- Tides on Europa with Gabriel Tobie and John Wahr (2009)
- Interior Structure of Titan (2009)
- Geology of Titan (R. Jaumann is first author)
- Internal dynamics of the medium size icy satellites (D. Matson is first author)
- Interior structure of Exoplanets for University of Arizona Press

**Other duties**

- Member of Science Advisory Committee of the French Space Agency (CNES)
- Participation at one NASA panel
- Member of the Mars Architecture Tiger Team
- Concept study of a mission to Uranus
- Member of several science panels at JPL

**Advisor for undergraduate students**

JPL has programs which allow undergraduate students to work at JPL. I have mentored several undergraduate students who spent a few months at JPL (Bianca Reinhardt (2011), Henry Tom (2010), Brian Anderson (2010), Frances Wolke (2008-2009).)

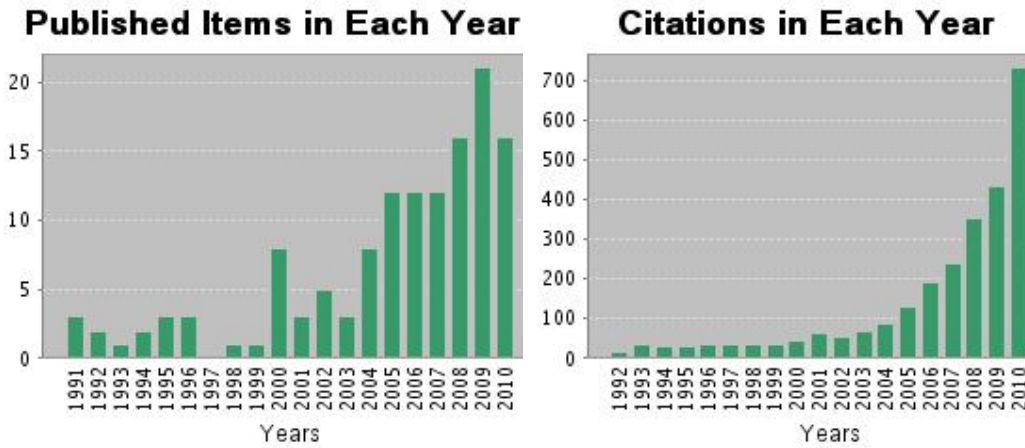
**PI of the Discovery proposal JET (Journey to Enceladus and Titan)**

During the period May-August 2010, with a team of engineers at JPL, we wrote a proposal to study Titan and Enceladus using a NASA developed technology for power. This mission will take situ measurements of Titan's upper atmosphere and Enceladus' plume and will acquire high resolution images of Titan's surface.

**US-lead of the Cosmic Vision M3 proposal TAE (Titan Aerial Explorer)**

During the period October-November 2010, I helped in the design of a mission to Titan which would use a balloon to explore the lower atmosphere, surface and subsurface of Titan.

## List of publications in peer-reviewed journals



January 2011: Number of publications and number of citations per year for the period 1991-2010. These figures were obtained from the web of knowledge on January 31, 2011. h-index is equal to 31.

**Note January 31, 2011:– Abstracts are not up o date – Special PSS issues -**

### Last update: January 2011

- 142- Clark R.N., Curchin J.M., Barnes J.W., Jaumann R., Soderblom L., Cruikshank D.P., Brown R.H., Rodriguez S., Lunine J., Stephan K., Hoefen T.M., Le Mouelic S., Sotin C., Baines K.H., Buratti B.J., Nicholson P.D. (2010) Detection and mapping of hydrocarbon deposits on Titan et al.; *J. Geophys. Res.*, 115, E10005.
- 141- Krupp N., Khurana K.K., Iess L., Lainey V., Cassidy T.A., Burger M., Sotin C., Neubauer F. (2010) Environments in the Outer Solar System; *Space Sci. Rev.*, 153,11-59.
- 140- Hussmann H, Choblet G, Lainey V, (2010) Implications of Rotation, Orbital States, Energy Sources, and Heat Transport for Internal Processes in Icy Satellites; *Space Sci. Rev.*, 153, 317-348.
- 139- Schubert G, Hussmann H, Lainey V, Matson, D. L., McKinnon, W. B., Sohl, F., Sotin, C., Tobie, G., Turrini, D., Van Hoolst, T. (2010) Evolution of Icy Satellites; *Space Sci. Rev.*, 153, 447-484.
- 138 – Rannou P, Cours T, Le Mouelic S, ... **Sotin C.** et al. (2010) Titan haze distribution and optical properties retrieved from recent observations; *Icarus*, 208, 850-867.
- 137 - Davies A.G., **Sotin C.**, Matson D.L. et al. (2010) Atmospheric control of the cooling rate of impact melts and cryolavas on Titan's surface; *Icarus*, 208, 887-895.
- 136 - Soderblom, J.M., Brown R.H., Soderblom L.A., ... **Sotin C.** et al (2010) Geology of the Selk crater region on Titan from Cassini VIMS observations; *Icarus*, 208, 905-912.
- 135 - Beghin C, **Sotin C**, Hamelin M (2010) Titan's native ocean revealed beneath some 45 km of ice by a Schumann-like resonance; *C.R. Acad. Sci.*, 342, 425-433.
- 134 - Robuchon G, Choblet G, Tobie G, Cadek O, **Sotin C**, Grasset O (2010) Coupling of thermal evolution and despinning of early Iapetus; *Icarus*, 207, 959-971.
- 133 - Stephan K, Jaumann R, Brown RH, Soderblom JM, Soderblom LA, Barnes JW, **Sotin C**, Griffith CA, Kirk RL, Baines KH, Buratti BJ, Clark RN, Lytle DM, Nelson RM, Nicholson PD(2010) Specular reflection on Titan: Liquids in Kraken Mare; *Geophys. Res. Lett.*, 37, L07104.
- 132 – Alibert Y, Broeg C, Benz W, Wuchterl G, Grasset O, **Sotin C**, Eiroa C, Henning T, Herbst T, Kaltenecker L, Leger A, Liseau R, Lammer H, Beichman C, Danchi W, Fridlund M, Lunine J, Paresce F,

- Penny A, Quirrenbach A, Rottgering H, Selsis F, Schneider J, Stam D, Tinetti G, White GJ (2010) Origin and formation of planetary systems; *Astrobiology*, 10, 19-32.
- 131 – Glassmeier KH, Auster HU, Heyner D, ... **Sotin C.**, ... (2010) The fluxgate magnetometer of the BepiColombo Mercury Planetary Orbiter; *Planet. Space Sci.*, 58, 287-299.
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## List of books and peer-reviewed chapters in books

### Book:

Sotin, C., Grasset, O., and Tobie, G. (2009) *Planetologie: Géologie des planètes et satellites* ; Dunod (Ed), 348 pp.

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**Sotin, C.**, Jackson J.M., Seager S. (2010) Terrestrial planet interiors; in *Exoplanets*, S. Seager (Ed), University of Arizona Space Science Series, 375-395.

Jaumann R., Kirk R.L., Lorenz R., Lopes R.M.C., Stofan E., Turtle E.P., Keller H.U., Wood C.A., **Sotin C.**, Soderblom L.A., Tomasko M.G. (2009) Chapter 5: Geology and surface processes on Titan; In: Brown, R.H., Waite, H., Dougherty, M. (Eds.), *Titan from Cassini-Huygens*, Springer-Verlag, 75-140.

Matson, D.L., Castillo-Rogez, J.C., Schubert, G., **Sotin, C.**, and McKinnon, W.B. (2009) Chapter 18: The Thermal Evolution and Internal Structure of Saturn's Mid-Sized Icy Satellites; in *Saturn from Cassini-Huygens*, Dougherty M. et al. (Eds).

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Smrekar, S., Elkins-Tanton, L., Leitner, J., Lenardic, A., Mackwell, S., Moresi, L-N., **Sotin, C.** and Stofan, E. (2007) Tectonic and thermal evolution of Venus and the role of volatiles: Implications for understanding the terrestrial planets; *Venus as a Terrestrial Planet*.

**Sotin C.** (2004) Thermal evolution of the Earth during the first billion years;

**Sotin, C.** (2001) Modèles géophysiques de l'évolution dynamique de la Terre au cours du premier milliard d'années; in *Exobiologie* (eds Gargaud et al.), Presses universitaires de Bordeaux, 237-262.

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## List of invited and solicited talks

- Sotin C.**; The habitability of icy moons; Seminar of the Astrobiology Program, UW Seattle, November 2011.
- Sotin C.**, Brown RH, Lawrence KJ, Le Mouelic S, Barnes J, Soderblom J, and the VIMS team; High resolution mapping of Titan with VIMS; EuroPlanet Science Congress, Rome, September 2010.
- Brown, R.H. and **Sotin C.**, Titan from Cassini, COSPAR meeting, Bremen, Germany; 2010.
- Sotin C. et al.**, Titan's surface as seen by VIMS, COSPAR meeting, Bremen, Germany; 2010.
- Sotin C.**, Cryovolcanism and activity on Titan; workshop "Titan through time", Goddard Space Flight Center, April 2010.
- Sotin C.**, Ocean Worlds; Conference on "Exoplanets Rising: Astronomy and Planetary Science at the Crossroads", KITP/UCSB, March 2010.
- Sotin C.**, Thermal convection and plate tectonics on Earth-like exoplanets ; UC Santa Barbara, February 2010.
- Sotin C.**, Mini-Neptunes and Super-Earths: can we make the difference; Kavli Institute for Theoretical Physics, UCSB, February 2010.
- Sotin C., et al.**, Laboratory experiments on the interaction between ice and hydrocarbons: implications for the formation of lakes on Titan; AGU, San Francisco, December 2009.
- Sotin C., et al.** Comparing VIMS observations of the Huygens Landing Site with DISR and radar observations: implications for Titan geology and its spin rate European Planetary Science Congress, Potsdam, September 2009.
- Sotin C.**, Methane in Exoplanets: Lessons from Mars and Titan, Exeter Exoplanet Workshop, Exeter, UK, September 2008.
- Sotin C.**, Convective motions within icy mantles, workshop on "Exchange processes in icy moons", International Space Science Institute, Bern, Switzerland, November 2008.
- Sotin C.**, G. Mitri, N. Rappaport, G. Schubert, D. Stevenson; Titan's internal structure after Cassini-Huygens ; 'Titan after Cassini-Huygens' workshop, Corpus Christi, TX, July 2008.
- Sotin C., G. Tobie and O. Cadek**, Solid tidal friction above a liquid water reservoir as the origin of the South Pole Hotspot on Enceladus, Cassini PSG meeting, Roma, Italy, June 2008
- Sotin C.**, Tobie G., Duval P.; Convection in icy satellites: models and constraints from laboratory experiments; Science of Solar System Ices (ScSSI) Workshop, Oxnard, May 2008.
- Sotin C.**, Extrapolating solid Earth models to terrestrial exoplanets; JPL, April 2008.
- Sotin C.**, Titan's geology: comparison with icy satellites and earth-like planets; Caltech, April 2008.
- Sotin C.**, Extrapolating solid Earth models to terrestrial exoplanets; University of Arizona, April 2008.
- Sotin, C.**; Comparing the evolution of the Earth, Mars and Titan (Runcorn-Florensky Medal Lecture) (solicited); European Geophysical Union, Vienna, 2008.
- Sotin, C.**; Le Corre, L.; LeMouelic, S.; Barnes, J.W.; Brown, R.H.; Jaumann, R.; Soderblom, J.; Baines, K.; Buratti, B.; Clark, R.; CASSINI/VIMS observations of cryo-volcanic features on Titan: implications for the methane cycle (solicited); European Geophysical Union, Vienna, 2008.
- Sotin, C.**; Choblet, G.; Tobie, G. ; Patterns of convection and surface expression of subsolidus convection within terrestrial planets and icy satellites (solicited); European Geophysical Union, Vienna, 2008.
- Sotin C.**, Titan's geology: comparison with icy satellites and earth-like planets; UCLA, February 2008.
- SOTIN C.**, Mars' Early History Revealed by Recent Missions: Implications for the Search for Water and Organic Matter, COSPAR, Beijing, China, 17 Juillet 2006.
- SOTIN C.**, Internal structure and dynamics of icy satellites, Workshop 'Planetary Science : challenges and discoveries', 18<sup>th</sup> Rencontres de Blois, Mai 2006.
- SOTIN C.**, News from Mars and Titan, Prague, Decembre 2005.
- SOTIN C.**, Habitability of subsurface oceans within icy satellites, ISSI, Septembre 2005.
- SOTIN C.**, Recent results of the Cassini-Huygens mission, DLR Berlin, 4 Mai 2005.
- SOTIN C.**, et al., 2005, Analysis of VIMS image cubes : clues on Titan geology, EGU, Vienna, 25 Avril 2005, Geophysical Research Abstracts, 7, 03859.
- SOTIN C.**, 2005, Titan : observations by Cassini-Huygens, JPL-Pasadena, 25 Février 2005.
- SOTIN C.**, 2004, Ocean in the solar system and beyond, Darmstadt, Germany, 2 Novembre 2004.
- SOTIN C.**, 2004, Water in the solar system and beyond, Jet Propulsion Laboratory and Caltech, Pasadena, 4 Mai 2004.
- SOTIN C.**, 2004, Water in the solar system and beyond, Geotop conference at McGill university and université du québec à Montréal (UQAM), Montréal, 2 Avril 2004.
- SOTIN C.**, TOBIE G., CHOBLET G., 2002, Effect of tidal heating on thermal evolution models of Europa and Titan, AGU, 6-10 Décembre 2002.

- SOTIN C.**, 2002, Oceans in the solar system, colloque 'Earth-like planets and moons', ESLAB Symposium 36, ESTEC, Noordwich, 3-8 Juin 2002.
- SOTIN C.**, **TOBIE G.**, 2002, Thermal convection, tidal heating and shallow partial melting within Galilean icy satellites, EGS, Nice, 22-26 Avril 2002.
- SOTIN C.**, 2002, Europa : convection, tidal heating and deep ocean, UCLA, 4 Mars 2002.
- SOTIN C.**, 2001, Thermal boundary layer instabilities within Earth-like planets : application to Mars, Mexican meeting on Mathematical and experimental physics, 10-14 Septembre 2001.
- SOTIN C.**, 2001, Structure and Dynamics of Icy satellites, Cornell University, 1 Mai 2001.
- SOTIN C.**, 2001, Thermal evolution of Mars, Brown University, 26 Avril 2001.
- SOTIN C.**, 2001, Geophysics of Mars : present knowledge and key questions, Congrès Mars-Netlander 2007, Nantes, 2-4 Avril 2001.
- SOTIN C.**, 2000, Models of the internal structure of Titan and Europa, COSPAR Meeting, Varsovie (Pologne), Juillet 2000.
- SOTIN C.**, **GRASSET O.**, **KARGEL J.**, 1999, High-Pressure experiments on Hydrates and the fate of a deep ocean within Europa, AGU, San Francisco, Decembre 1999.
- SOTIN C.** and **SQUYRES S.**, 1999, The Mars Sample Return Mission, 1<sup>st</sup> African Summit on Science and New Technology, Libreville (Gabon), November 1999
- SOTIN C.**, 1999, Thermal Boundary Layer instabilities and the dynamics of the Earth's mantle, Séminaire invité à l'Université d'Utrecht, 4 Mars 1999.

## Invited talks at French universities and French meetings

- Sotin C.**, 2010, Satellites des planètes géantes, Conférence publique du bureau des longitudes, Mercredi 5 Mai 2010, Fondation Del Duca, Paris.
- Sotin C.**, 2009, La géodynamique de Titan à partir des données Cassini: couplage entre la dynamique interne et l'atmosphère ; Institut de Physique du globe de Paris, Octobre 2009.
- Sotin C.**, 2006, Exploration de Mars et de Titan, Colloque du programme interdisciplinaire 'Origines des Planètes et de la Vie' , 6 Décembre 2006.
- Sotin C.**, 2006, La topographie des planètes telluriques, Colloque du programme national 'Reliefs de la Terre', 10 Octobre 2006.
- Sotin C.**, 2006, Titan vu par Cassini-Huygens, Conférence à l'Institut d'Astrophysique Spatial, Orsay, 28 Septembre 2006.
- Sotin C.**, 2006, Résultats de la mission Cassini-Huygens, Conférences du BdL, Académie des Sciences, 1 Février 2006.
- Sotin C.**, 2005, Derniers résultats de la mission Cassini-Huygens, Orléans, 7 Juin 2005.
- Sotin C.**, 2005, Modèles d'évolution de Titan : apport des dernières observations de Cassini-Huygens, Orléans, 1 Avril 2005.
- Sotin C.**, 2005, Le champ magnétique des planètes, GDR dynamo, Grenoble, 22 Mars 2005.
- Sotin C.**, 2005, Exploration de Mars et du système de Saturne, Grenoble, 22 Mars 2005.
- Sotin C.**, 2005, Titan et les autres satellites de Saturne : derniers résultats de la mission Cassini-Huygens, Toulouse, 10 Mars 2005.
- Sotin C.**, 2004, Convection thermique dans le manteau des planètes, Ecole Prédoctorale des Houches, 8 Septembre 2004.
- Sotin C.**, 2004, Propriétés physiques et chimiques des glaces : applications planétologiques, Physique des minéraux : journée scientifique en l'honneur de Jean-Paul Poirier, IPG Paris, 26 Mars 2004.
- Sotin C.**, 2003, Dynamique et structure interne des satellites de glace des planètes géantes, Observatoire Midi-Pyrénées, Toulouse, 20 Novembre 2003.
- SOTIN C.**, 2003, Océans dans le système solaire, Ecole d'Exobiologie, Propriano, 24 Septembre 2003.
- SOTIN C.**, 2003, Océans dans le système solaire, Nancy, 30 Janvier 2003.
- SOTIN C.**, 2002, Bilan et perspectives du programme Intérieur de la Terre, Prospective CNRS/INSU, Vulcania 22-24 Septembre 2002.
- SOTIN C.**, 2002, Perspective d'exploration de Mars, Pré-séminaire de la prospective CNES, Paris 13-14 Septembre 2002.
- SOTIN C.**, 2002, Habitats et signatures de vie : le cas d'Europe, Colloque du GDR Exobio, Paris, 27-29 Mai 2002.
- SOTIN C.**, 2001, Les programmes de recherche en Sciences de l'Univers, Séminaire SDU pour les entrants au CNRS, 4 Décembre 2001.
- SOTIN C.**, 2001, Evolution de Mars, Ecole Doctorale des Sciences de l'Univers, Strasbourg.
- SOTIN C.**, 2000, L'exploration de Mars et la conquête de nouveaux territoires, Colloque 'Science et Société, Mohammedia (Maroc), 14-16 Novembre 2000.
- SOTIN C.**, 2000, Quitter la Terre : pour quoi faire. L'exemple de l'exploration de Mars, Assemblée Générale de l'IUF, Marseille, 18-19 Mai 2000.
- SOTIN C.**, 2000, Application des modèles 3D de convection thermique à l'étude de l'évolution des planètes, Séminaire invité à l'Ecole Polytechnique de l'Université de Nantes, 9 Mars 2000.
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