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**Etat civil:**

Né le 9 octobre 1968, à Lorient (Morbihan, 56)  
Nationalité française

**Cursus:**

2007 : Professeur des Universités (Univ. de Reims Champagne-Ardenne, section 34)  
2006 : Membre Junior de l'Institut Universitaire de France  
2006 : Habilitation à diriger des recherches (soutenue le 14 novembre 2006)  
1997- : Maître de conférences (Université Versailles-St-Quentin, section 34)  
1996-1997: Post-Doc à NASA Ames Research Center (NRC Award).  
1993-1996: Doctorat de l'Université Paris 6 (Spécialité: Astronomie).  
1991-1992: DEA Océanologie, Météorologie et Environnement (Paris 6).

**Thèmes de recherche:**

- Microphysique et transfert radiatif dans l'atmosphère de Titan et Mars.
- Diffusion par des particules irrégulières.
- Couplage microphysique-dynamique dans l'atmosphère de Titan.

**Encadrement de thèses:**

- 1999-2002, Franck Montmessin : (50 % - Dir: M. Cabane, SA/IPSL)  
Microphysique des nuages et poussières sur Mars.  
*Actuellement:* CR1 au CNRS (Service d'Aéronomie, UMR 7620).
- 2002-2005, Tran-The-Trung : (50 % - Dir: J.-P. Pommereau, SA/IPSL)  
Développement d'un capteur optique de poussières (ODS).  
*Actuellement:* Enseignant, Ecole de commerce FTP, Hanoï, Viet-Nam.
- 2002-2006 Alberto Negro : (15 % - Dir: A. Coustenis, LESIA, Obs. Meudon )  
Analyse de spectres et de spectro-imagerie IR de Titan.  
*Actuellement:* Enseignant à l'ESTG de Leiria, Portugal.
- 2008-2011 Jérémie Burgalat (GSMA, Université Reims Champagne-Ardenne)  
Microphysique des nuages dans le modèle de circulation 3D de Titan.  
*Actuellement:* IR CDD au LATMOS Université Paris 6
- 2012-2015 Daniel Toledo (GSMA, Université Reims Champagne-Ardenne)  
Préparation du capteur de poussière ODS pour Mars.  
*Début de thèse le 10 octobre 2012*
- 2014-2017 Benoît Seignovert (GSMA, Université Reims Champagne-Ardenne)  
Formation des Aerosols par Croissance Moléculaire sur Titan.  
*Début de thèse le 1er octobre 2014*

## **Implication/responsabilité dans la communauté scientifique:**

- 2012-2016, Membre du de la section 19 du comité national du CNRS
- 2012-2014, Membre du conseil du département de physique - UFR Sciences Exactes et Naturelles
- 2012-2015, Responsable du projet ANR APOSTIC (48 mois)
- 2010-, Co-responsabilité l'instrument ODS/Mars 2016 (avec J.P. Pommereau - LATMOS)
- 2010-, Membre du Comité scientifique du LMDZ (Modèle de Climat du LMD).
- 2008-, Membre du Conseil de Laboratoire du GSMA.
- 2001-2006, Membre du CS du Programme National de Planétologie (PNP).
- 2001-2005, Membre du CS de l'Institut Pierre-Simon Laplace (IPSL).
- 2003-2004, Membre du CS de l'université de Versailles-St-Quentin (UVSQ).
- 2000-2007, Membre de la Commission de Spécialiste (34-35-37) de IUVSQ.

## **Publications dans des revues internationales à comité de lecture**

- 71- Toledo, D., Rannou, R., Pommereau, J-P., Sarkissian, A., and Foujols, T., "Measurement of aerosol optical depth and sub-visual cloud detection using the optical depth sensor (ODS)", *Atmospheric Measurement Techniques*, under revision, (2015)
- 70- Rannou, P., D. Toledo-Carrasco, P. Lavvas, E. D'Aversa, M. L. Moriconi, A. Adriani, S. Le Mouélic, C. Sotin et R. Brown, "Moisted Titan surface at the Huygens Landing Site and around Shangri-la", under revision (2015)
- 69- West, R.A., A.D. Del Genio, J.M. Barbara, D. Toledo, P. Lavvas, P. Rannou, E.P. Turtle, J. Perry; "Cassini Imaging Observations of Titan's South Polar Cloud", *accepted*, *Icarus*, (2014)
- 68- Lavvas, P., West, R.A., Gronoff, G. and Rannou, P., "Titan's emission processes during eclipse", *Icarus*, 241, p. 397-408, (2014)
- 67- Burgalat, J., Rannou, P. Cours T. and Rivière, E. "Study of Titan annual and diurnal cycles with a description of distributions with moments", *Icarus* 231, 310–322 (2014).
- 66- Hirtzig, M., Bézard, B., Lellouch, E., Coustenis, A., de Bergh, C., Drossart, P., Campargue, A., Boudon, V., Tyuterev, V., Rannou, P., Cours, T., Kassi, S., Nikitin, A., Mondelain, D., Rodriguez, S., and Le Mouélic, S. "Titan's surface and atmosphere from Cassini/VIMS data with updated methane opacity", *Icarus*, Volume 226, 470-486, (2013).
- 65- Griffith, C.A., Rafkin, S., Rannou, P. and McKay, "Storms, Clouds and Weather", Chapitre de la monographie "Titan", Cambridge University Press, Eds I. Mueller-Wodarg, C. Griffith, E. Lellouch and T. Cravens (2012)
- 64- Vinatier, S., Rannou, P., Anderson, C., M.; Bézard, B., de Kok, R. and Samuelson, R., "Optical constants of Titan's stratospheric aerosols in the 70-1500 cm<sup>-1</sup> spectral range constrained by Cassini/CIRS observations" *Icarus*, Volume 219, Issue 1, 5-12, (2012)
- 63- Rannou, P., Le Mouélic, S., Sotin, C. and Brown, R.H., " Cloud and haze in the winter polar region of Titan observed with VIMS onboard Cassini", *The Astrophysical Journal*, 748 - 4, (2012).
- 62- Lebonnois, S., Burgalat, J., Rannou, P. and Charnay, B., "Titan Global Climate Model: a new 3-dimensional version of the IPSL Titan GCM", *Icarus*, 218, 707-722, (2012).
- 61- De Bergh, C., R. Courtin, B. Bézard, A. Coustenis, E. Lellouch M. Hirtzig, P. Drossart, A. Campargue, S. Kassi, L. Wang V. Boudon A. Nikitin, V. Tyuterev and P. Rannou "Applications of a new set of methane line parameters to the modeling of Titan's spectrum in the 1.58-micron window", *Planetary and Space Science* 61, 85–98,(2012).
- 60- Cordier, D., Mousis, O., Lunine, J.I., Lebonnois, S., Rannou, P., Lavvas, P., Lobo, L.Q., and Ferreire, A.G.L., Titan's lakes chemical composition : sources of uncertainties and variability *Planetary and Space Science* 61, 99–107, (2012) .
- 59- Le Mouélic, S., Rannou, P., Rodriguez, S., Sotin, C., Griffith, C., Le Corre, L., Barnes, J., Brown, R.H., Baines, K.H., Buratti, B., Clark, R.N., Nicholson, P.D. and G., "Dissipation of Titan's North Polar Cloud at Northern Spring Equinox" *Planetary and Space Science*, 60, Issue 1, p. 86-92 (2012).
- 58- Cours, T., Burgalat, J., Rannou, P., Rodriguez, S., Brahic, A. and West, R. A., "Dual Origin of Aerosols in Titan's Detached Haze Layer", *The Astrophysical Journal Letters*, Volume 741, Issue 2, article id. L32 (2012).
- 57- Rodriguez, S., Le Mouélic, S., Rannou, P., Sotin, C., Brown, R.H., Barnes, J.W., Griffith, C.A., Burgalat, J., Baines, K.H., Buratti, B.J., Clark, R.N. and Nicholson, P.D. "Titan's cloud activity from winter

to spring with Cassini/VIMS", *Icarus*, 216, 89-110, (2011).

-57- West, R.A., Balloch, J., Dumont, P., Lavvas, P., Lorenz, R., P., Ray, R., and Turtle, E., "The Evolution of Titan's Detached Haze near Equinox in 2009", *Geophysical Research Letter*, 38, L06204, (2011).

-56- Cours, T., Rannou, P., Negrão, Coustenis, A., and Hamdouni, H., "A new analysis of the ESO Very Large Telescope (VLT) observations of Titan at 2  $\mu\text{m}$ ". *Planetary and Space Science*, doi:10.1016/j.pss.2009.12.009, (2010).

-55- Rannou, P., Cours, T., Le Mouélic, S., Rodriguez S., Sotin, C., R. Brown and P. Drossart "Titan haze distribution and optical properties retrieved from recent observations", *Icarus*, doi:10.1016/j.icarus.2009.12.009, (2010).

-54- Rannou, P. and Durr, G., "The extinction layer detected by the 2003 star occultation on Pluto", *Journal of Geoph. Res.*, doi:10.1029/2009JE003383, (2009).

-53- Rodriguez, S., Le Mouélic, S., Rannou, P., Tobie, G., Baines, K.H., Barnes, J.W., Griffith, C.A., Hirtzig, M., Pitman, K.M., Sotin, C., Brown, R.H., Buratti, J., Clark, R.N. and Nicholson, P.D. "clouds revealing Titan's global climatology", *Nature*, , 7247, 678-682 (2009).

-52- Bellucci, A., Sicardy, B., Drossart, P., Rannou P., Nicholson, P.D., Heldman, M. and Baines, K.H. "Titan solar occultation observed by Cassini/VIMS: gas absorption and constraints on aerosol composition", *Icarus*, , 198-216, (2009).

-51- Coustenis, A., Atreya, S. K., Balint, T., Brown, R. H., Dougherty, M. K., Ferri, F., Fulchignoni, M., Gautier, D., Gowen, R. A., Griffith, C. A., and 146 coauthors, "TandEM: Titan and Enceladus mission", *Experimental Astronomy*, , Issue 3, pp.893-946 (2009).

-50- Lebonnois, S., Rannou, P., Hourdin, F. "The coupling of winds, aerosols and chemistry in Titan s atmosphere", *Royal Society Philosophical Transactions A: Mathematical, Physical and Engineering Sciences*, 367, 1889, 665-682 (2008).

-49- Cressin, A., Lebonnois, S., Vinatier, S., Bézard, B., Coustenis, A., Teanby, N. A., Achterberg, R. K., Rannou, P., Hourdin, F. "Diagnostics of Titan's stratospheric dynamics using Cassini/CIRS data and the 2-dimensional IPSL circulation model", *Icarus*, , 2, 556-571, (2008).

-48- Bertaux, J.-L., Vandaele, A.-C., Korablev, O., Villard, E., Fedorova, A., Fussen, D., Quémerais, E., Belyaev, D., Mahieux, A., Montmessin, F., Muller, C., Neefs, E., Nevejans, D., Wilquet, V., Dubois, J. P., Hauchecorne, A., Stepanov, A., Vinogradov, I., Rodin, A., Cabane, M., Chassefire, E., Chaufray, J. Y., Dimarellis, E., Lefvre, F., Rannou, P., Villard, E., Fussen, D., Muller, C., Neefs, E., van Ransbeeck, E., Wilquet, V., Stepanov, A., Zasova, L., Forget, F., Lebonnois, S., Titov, D., Rafkin, S., Durr, G., Gérard, J. C., and Sandel, B., "A warm layer in Venus' cryosphere and high-altitude measurements of HF, HCl, H<sub>2</sub>O and HDO", *Nature*, , 7170, 646-649 (2007).

-47- Bertaux, J.-L., Nevejans, D., Korablev, O., Villard, E., Quémerais, E., Neefs, E., Montmessin, F., Leblanc, F., Dubois, J. P., Dimarellis, E., Hauchecorne, A., Lefèvre, F., Rannou, P., Chaufray, J. Y., Cabane, M., Cernogora, G., Souchon, G., Semelin, F., Reberac, A., van Ransbeeck, E., Berkenbosch, S., Clairquin, R., Muller, C., Forget, F., Hourdin, F., Talagrand, O., Rodin, A., Fedorova, A., Stepanov, A., Vinogradov, I., Kiselev, A., Kalinnikov, Yu., Durr, Georges, Sandel, B., Stern, A., Gérard, J. C., "SPICAV on Venus Express: Three spectrometers to study the global structure composition of the Venus atmosphere", *Plan. Space Sci.*, , 12, 1673-1700, (2007).

-46- Hirtzig, M., A., Coustenis, A., Gendron, E., Drossart, P., Hartung, M., Negrão, A., Rannou, P., and Combes M. "Titan : atmospheric and surface features as observed with NAOS/CONICA at the time of the Huygens' landing", *Journal of Geophysical Research*, , E02S91, doi: 10.1029/2005JE002650, (2007).

-45- Negrão, A., Coustenis, A., Hirtzig, M., Gendron, E., Drossart, P., Rannou, P., Combes, M., and Boudon, V. "2-micron spectroscopy of Huygens landing site on Titan with VLT/NACO", *Journal of Geophysical Research*, , E02S92, doi:10.1029/2005JE002651, (2007).

-44- Bertaux, J.-L., Korablev, O., Perrier, S., Quémerais, E., Montmessin, F., Leblanc, F., Lebonnois, S., Rannou, P., Lefèvre, F., Forget, F., Fedorova, A., Dimarellis, E., Réberac, A., Fonteyn, D., Chaufray, J.-Y., Guibert, S. "SPICAM on Mars Express: Observing modes and overview of UV spectrometer data and scientific results" of *Geophysical Research*, E10S90, doi:10.1029/2006JE002690, (2006).

-43- Negrão, A., Coustenis, A., Lellouch, E., Maillard, J.-P., Rannou, P., Schmitt, B., McKay, C. P., and Boudon, V. "Titan's surface albedo from near-infrared CFHT/FTS spectra : modeling dependence on the methane absorption", *Planet. Space Sci.*, 54, 1225-1246 (2006).

-42- Rannou, P., Perrier, S., Bertaux, J.-L., Montmessin, F., Korablev, O. et Réberac, A. "Dust and clouds detection at Mars limb with UV scattered sunlight with SPICAM", *Journal of Geophysical Research*, 111 E09S10, doi:10.1029/2006JE002693 (2006)

-41- Griffith, C. A., Pentead, P., Rannou, P., Brown, R., Boudon, V., Baines, K. H., Clark, R., Drossart, P.,

- Buratti, B., Nicholson, P., McKay, C. P., Coustenis, A., Negrão, A., and Jaumann, R. "Evidence for a Polar Ethane Cloud on Titan", *Science*, 313, 1620-1622 (2006).
- 40-** Hirtzig, M., A., Coustenis, A., Gendron, E., Drossart, P., Negrão, A., Combes M., Lai, O., Rannou, P., Lebonnois, S., and Luz, D. "Monitoring atmospheric phenomena on Titan", *Astronomy and Astrophysics*, 456, 761-774 (2006).
- 39-** Montmessin, F., Bertaux, J.-L., Quémerais, E., Korablev, O., Rannou, P., Perrier, S., Forget, F., Lebonnois, S., Fussen, D., Réberac, A. and Dimarellis, E. "Sub-visible CO<sub>2</sub> ice clouds detected in the Martian mesosphere", *Icarus*, , 403-410 (2006).
- 38-** Montmessin, F., Quémerais, E., Bertaux, J.-L., Korablev, O., Federova, Rannou, P. and Lebonnois, S. "Stellar occultations at UV wavelengths by the SPICAM instrument: retrieval and analysis of Martian haze profiles", *Journal of Geophysical Research*, S09, doi:10.1029/2005JE002662 (2006)
- 37-** Maria, J.-L., T.-T. Tran, Pommereau, J.-P., P. Rannou, C. Malique, J.-J. Correia, and J. Porteneuve , "Technical aspect of the instrument Optical Depth Sensor", *Adv. Space Res.*, , 726-729 (2006).
- 36-** Rannou, P., Montmessin, F., Hourdin, F. and Lebonnois, S. "On the latitudinal distribution of clouds on Titan", *Science*, 311, 201-205 (2006).
- 35-** Coustenis, A., Negrão, A., Salama, A., Schulz, B., Lellouch, E., Rannou, P., Drossart, P., Encrenaz, T., Schmitt, B., Boudon, V. and Nikitin, A. "Titan's 3-micron spectral region from ISO high-resolution spectroscopy", , 180, 176-185 (2006).
- 34-** Rannou, P., Lebonnois, S., Hourdin, F. and Luz, D., "Titan Atmosphere Database", *Adv. Space Res.*, 36, 2194-2198 (2005).
- 33-** Tran, T. T., J.-P. Pommereau, Rannou, P. and Maria, J.-L., "Scientific aspect of the instrument Optical Depth Sensor", *Adv. Space Res.*, 36, 2182-2186 (2005).
- 32-** Luz, D., Civeit, T., Courtin, R., Lebreton, J.-P., Gautier,., Rannou, P., Kaufer, A., Witasse, O., Lara, L., and Ferri, F. "Characterization of Zonal Winds in the stratosphere of titan with UVES", *Icarus*, 179, 497-510 (2005).
- 31-** Hirtzig, M., Coustenis, A., Lai, O., Emsellem, E., Pecontal-Rousset, A., Rannou, P., Negrão, A., and Schmitt, B., "Near-infrared study of Titan's resolved disk in spectro-imaging with CFHT/OASIS". *Space Sci.*, 53, 535-556, (2005).
- 30-** Negrão, A. Roos-Serote, M., Rannou, P., Rages, K., and Lourenço, B., " On the latitudinal distribution of Titan's haze at the Voyager epoch " . *Space Sci.*, 53, 526-534, (2005).
- 29-** Hourdin, F., Lebonnois, S., Luz, D., and Rannou, P., "Titan stratospheric composition driven by condensation and dynamics", *Journal of Geophysical Research*, 109, No. E10, E10005, doi: 10.1029/2004JE002282, (2004).
- 28-** Anderson, C.M., Chanover, N.J., McKay C.P., Rannou P., Glenar, D.A., and Hillman, J.J., "Titan's haze structure in 1999 from spatial ly-resolved narrow band surrounding the 0.94 um methane win- dow" . *Res. Letter*, 31, L17S06 doi:10.1029/2004GL019857. (2004).
- 27-** Montmessin, F., Forget, F., Rannou, P., Cabane, M. and Haberle, R. M., "Origin and role of water ice clouds in the Martian water cycle as inferred from a general circulation model", *Journal of Geophysical Research*, 109, No. E10, E10004, doi: 10.1029/2004JE002284, (2004).
- 26-** Rannou, P., Hourdin, F., McKay, C.P. and Luz, D., " A coupled dynamics-microphysics model of Titan's atmosphere " 170, 443-462 (2004).
- 25-** Rannou, P., McKay, C.P. and Lorenz, R.D., "A model of Titan's haze of fractal aerosols constrained by multiple observations", *Space Sci.*, 51, 963-976 (2003).
- 24-** Chanover, N.C., C.M. Anderson, C.P. McKay, P. Rannou, D.A. Glenar, J.J. Hillman and W.E. Blass, "Probing Titan's Lower Atmosphere with Acousto-Optic Tuning" , 163, 150-163, (2003).
- 23-** Griffith, C.A., T. Owen, T.R. Geballe, J. Rayner and P. Rannou, "Evidence for the exposure of water ice on Titan's surface" , 300, 628-630 (2003).
- 22-** Lebonnois, S., F. Hourdin, P. Rannou, D. Luz, and D. Toubblanc, "Impact of the seasonal variations of composition on the temperature field of Titan's stratosphere" , 163, 164-174, (2003).
- 21-** Luz, D., Hourdin, F., Rannou, P. and Lebonnois, S., "Latitudinal transport by barotropic waves in Titan's stratosphere: ii. results from a coupled dynamics-microphysics-photochemistry GCM" , 166, 343-358, (2003).
- 20-** Botet, R. and P. Rannou, "Optical anisotropy of an ensemble of aligned fractal aggregates", *Quant. Spectroc. radiat. transfer*, 78-80, 569-576, (2003).
- 19-** Montmessin, F., P. Rannou and M. Cabane, " New insights into martian dust distribution and water-ice cloud microphysics", . *Geoph. Res.* 102, 10,997-11,013, (2002).
- 18-** Rannou, P., F. Hourdin and C.P. McKay, "Wind origin for Titan's haze structures", , 418, 853-856,

(2002).

-17- Young, E.F., P. Rannou, C.P. McKay, C.A. Griffith and K. Noll, "A three dimensional map of Titan's Tropospheric haze distribution based on HST imaging", . Journ., 123-6, 3473-3486 (2002).

-16- Chassefière, E. J.J. Berthelier, J.-L. Bertaux, E. Quemerais, E., J.-P. Pommereau, P. Rannou, F. Raulin, P. Coll, D. Coscia, A. Jambon, P. Sarda, J.-C. Sabroux, G. Vitter, A. Le Pichon, B. Landeau, P. Lognonné Y. Cohen, S. Vergnole, G. Hulot, M. Mand'au, J.-F. Pineau, B. Bézard, H.-U. Keller, D. Titov, D. Breuer, K. Szego, C. Ferencz, M. Roos-Serote, O. Korablev, V. Linkin, R. Rodrigo, F. W. Taylor, A.-M. Harri, Lavoisier mission : A system of descent probe and balloon flotilla for geochemical investigation of the deep atmosphere and surface of Venus", in Space Research, 29/2, 255-264, (2002)

-15- Coustenis, A., E. Gendron, O. Lai, J.-P. Véran, J. Woillez, M. Combes, L. Vapillon, T. Fusco, L. Mugniez and P. Rannou, "Images of Titan at 1.3 and 1.6 micron with adaptive optics the CFHT", 154, 501-515, (2001).

-14- Lebonnois, S., D. Toublanc, F. Hourdin et P. Rannou, "Seasonal variations of Titan's atmospheric composition", , 152, 384-406 (2001).

-13- Cabane, M., Coll, P., Israel, G., Raulin, F., Sternberg, R., A., Rodier, C., Rannou, P., Niemann, H. and Mahaffy, P., "In-situ inorganic and organic analysis (Pyr/CIGC/MS) of the martian soil, on Mars 2005 mission", . Space Sci., 49, 523-531, (2001).

-12- Rannou, P., E. Chassefière, T. Encrenaz, S. Erard, J.M. Génin, J. Ingrin, A. Jambon, J.P. Jolivet, F. Raulin, P. Renault, P. Rochette, A. Person, J.M. Siguier, D., "Exocam: Mars in a box to simulate oil-atmosphere interactions in Space Research, 27/2, 189-193, (2001).

-11- McKay, C.P., A. Coustenis, R.E. Samuelson, M.T. Lemmon, R.D. Lorenz, M. Cabane, P. Rannou, P. Drossart, "Physical properties of the organic aerosols and clouds on Titan", Planet. Space Science, 49, 79-99, (2001).

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-9- Rannou P., C. Ferrari, K. Rages, M. Roos-Serote et M. Cabane, "Characterization of aerosols in the detached haze of Titan", , 147, 267-281 (2000).

-8- Botet R. et P. Rannou, "Multispectral backscattering: a fractal-structure probe," : "Paradigms of Complexity - Fractals and Structures in the Sciences" ed. M.M. Novak pps 29-39, World Scientific, Singapore (2000).

-7- Rannou P., C.P. McKay, R. Botet et M. Cabane, "Semi-empirical model of absorption and scattering by isotropic fractal aggregates of spheres", . Space Science, 47, 385-396 (1999).

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-5- Rannou P., M. Cabane, E. Chassefière et R. Botet, "A new interpretation of scattered light measurements at Titan's limb", . Geoph. Res., 102, 10,997-11,013 (1997).

-4- Botet R., P. Rannou et M. Cabane, "Sensitivity of some properties of fractals to the cut-off functions," J. Phys. A:Math Gen 28, 297-317 (1995).

-3- Rannou P., M. Cabane, E. Chassefière, R. Botet et C.P. McKay, "Titan's geometry albedo: Role of the fractal structure of the aerosols", , 111, 355-372 (1995).

-2- Rannou P., M. Cabane et E. Chassefière, "Growth of aerosols in Titan's atmosphere and related time scales: A stochastic approach", Research Letters, 20, 967-970 (1993).

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### **Publications non référées**

-7- Tran, T-T, Rannou, P., Pommereau, J.-P., Maria, J.-L., Correia, J.-J., Porteneuve, J., and Malique, C. "The optical depth sensor", Notes du Pole de Planétologie de l'Institut Pierre Simon Laplace n° 11, ISSN 1768-0042, Mars 2005.

-6- Rannou P. and S. Lebonnois, "Haze formation and distribution on Titan", ESA SP-1278, 343-354 (2004).

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