

CHARNAY Benjamin

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Personal

Birth: January 2, 1986 in Heidelberg (Germany)

Citizenship: French

Languages: French (native), English (fluent), German (notions)

Education

2010 - 2013 : PhD student at the Laboratoire de Météorologie Dynamique,

University Pierre and Marie Curie, Paris

Supervisors: François Forget and Sébastien Lebonnois

Dissertation: "[Tropospheric dynamics and climatic evolution of Titan and the early Earth](#)".

2009 - 2010 : Master 2 Université Pierre et Marie Curie (Paris)

Speciality: Ocean, Atmosphere, Climate and Spatial Observations (with honors)

July 2009 : « Agrégation » in Physics, competitive national exam (14th out of 1500) to allow teaching at college level

2007 - 2008 : Master 1 in Physics (with highest honors)

2006 - 2007 : Bachelor in Physics (with high honors)

2006 - 2010 : trainee civil servant, Ecole Normale Supérieure de Lyon

(position obtained after highly competitive national exam)

July 2004 : Baccalauréat : high school degree (with highest honors)

Current position

Research associate at LESIA, Observatoire de Paris (Meudon, FRANCE) supervised by Bruno Bézard and Anthony Boccaletti. Grant : PSL fellowship

Past position

2014-2016 : NASA fellow at the University of Washington (Seattle, USA)

Research internships

March 2010 - July 2010: "[Modelisation of the climate of extrasolar planets](#)"

advisor: François Forget (University Pierre and Marie Curie, Paris)

May 2008 - July 2008: "[Study of the ionosphere of Saturn](#)"

advisor: Mariana Galand (Imperial College, London)

June 2007 - July 2007: "[Study of a laser trap for a micro-condensate of Bose-Einstein](#)"

advisor: Fabrice Gerbier (Ecole Normale Supérieure, Paris)

Research interests

- Exoplanets and brown dwarfs
- Planetary atmospheres (Earth, Titan, Mars and Venus)
- Paleoclimates and atmospheric evolution

Computing skills

Environnement: Linux, Windows and Mac OS

Programmation: Fortran, C, Matlab and Python

Teaching

2010 - 2013: teaching at the University Pierre et Marie Curie

Physics for biology undergraduate students (90 h)

Experimental physics (30 h)

Supervising physics projects for undergraduate students (60 h)

Awards & honors

July 2014: PSL Fellow

Jan 2015: Award for the best thesis from the Comité Français de Géodésie et Géophysique

July 2014: NASA Postdoctoral Fellow

Dec 2013: Price of the best oral presentation, Conference Exobiology Young Researcher (Paris) for "Exploring the possible climates of the Archean Earth with a 3D GCM".

Dec 2013: Outstanding student paper at the AGU fall meeting 2013 for the poster "Is Titan's dune orientation controlled by methane storms".

Community service

- Science reviewer for NASA New Frontiers Program

- Referee for 8 scientific journals: Journal of Geophysical Research (Planets), Geophysical Research Letter, Icarus, Planetary & Space Sciences, Astrophysical Journal, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society and Astrobiology

Publication list

- 1) **B. Charnay**, B. Bézard, J.-L. Baudino, M. Bonnefoy, A. Boccaletti, R. Galicher. "A self-consistent cloud model for brown dwarfs and young giant exoplanets: comparison with photometric and spectroscopic observations". *submitted to The Astrophysical Journal*
- 2) R. Dietrick, R. Barnes, T. Quinn, J. Armstrong, **B. Charnay**, C. Wilhelm. "Exo-Milankovitch Cycles I: Orbits and Rotation States". *submitted to The Astronomical Journal*
- 3) S. Rodriguez et al. "Dust storms on Titan". *submitted to Nature Geoscience*
- 4) D. Mesa D., J.-L. Baudino, **B. Charnay**, V. D'Orazi, S. Desidera, et al. "New spectro-photometric characterization of the substellar object HR 2562 B using SPHERE". *submitted to Astronomy & Astrophysics*
- 5) B. Biller, J. Vos, E. Buenzli, K. Allers, M. Bonnefoy, **B. Charnay**, B. Bézard, F. Allard, D. Homeier, M. Bonavita, W. Brandner, I. Crossfield, T. Dupuy, T. Henning, T. Kopytova, M. Liu, E. Manjavacas, J. Schlieder. "Simultaneous, multi-wavelength variability characterization of the free-floating planetary object PSO J318.5-22". *The Astrophysical Journal (in press)*
- 6) P. Delorme, T. Schmidt, M. Bonnefoy, S. Desidera, C. Ginski, **B. Charnay**, C. Lazzoni, V. Christiaens, S. Messina, V. D'Orazi, J. Milli, J.E. Schlieder, et al. "In-depth study of moderately young but extremely red, very dusty substellar companion HD206893B".

- 7) G. Chauvin et al. "Discovery of a warm, dusty giant planet around HIP 65426". *Astronomy & Astrophysics*, 2017
- 8) M. Turbet, F. Forget, J. Leconte, **B. Charnay** and G. Tobie. "CO₂ condensation is a serious limit to the deglaciation of Earth-like planets". *Earth and Planetary Science Letters*, 2017
- 9) **B. Charnay**, G. le Hir, F. Fluteau, F. Forget and D. Catling. "A warm or a cold early Earth? New insights from a 3D climate-carbon model". *Earth and Planetary Science Letters*, 2017
- 10) M. Wong, **B. Charnay**, P. Gao, Y. Yung and M. Russell. "Nitrogen oxides in early Earth's atmosphere as electron acceptors for life's emergence". *Astrobiology*, 2017.
- 11) G. Arney, S. Domagal-Goldman, V. Meadows, E. Wolf, E. Schwieterman, **B. Charnay** and M. Claire. "The Pale Orange Dot: The Climate and Spectral Signatures of Hazy Archean Earth". *Astrobiology*, 2016
- 12) L. Shields, R. Barnes, E. Agol, **B. Charnay**, C. Bitz and V. S. Meadows. "The Effect of Orbital Configuration on the Possible Climates and Habitability of Kepler-62f". *Astrobiology*, 2016
- 13) J. Krissansen-Totton, E. Schwieterman, **B. Charnay**, G. Arney, T. D. Robinson, V. Meadows and D. C. Catling. "Is the Pale Blue Dot unique? Optimized photometric bands for identifying Earth-like exoplanets". *Astrophysical Journal*, 2016.
- 14) P. L. Read, J. Barstow, **B. Charnay**, S. Chelvaniththilan, P. G. J. Irwin, S. Knight, S. Lebonnois, S. R. Lewis, J. Mendonca and L. Montabone. "Global energy budgets and "Trenberth diagrams" for the climates of terrestrial and gas giant planets". *Quarterly Journal of the Royal Meteorological Society*, 2016.
- 15) **B. Charnay**, V. Meadows, A. Misra, J. Leconte and G. Arney. "3D modeling of GJ1214b's atmosphere: formation of inhomogeneous high clouds and observational implications". *Astrophysical Journal Letters*, 2015.
- 16) **B. Charnay**, V. Meadows and J. Leconte. "3D modeling of GJ1214b's atmosphere: vertical mixing driven by an anti-Hadley circulation". *Astrophysical Journal*, 2015.
- 17) **B. Charnay**, E. Barth, S. Rafkin, C. Narteau, S. Lebonnois., S. Rodriguez, S. Courrech du Pont and A. Lucas. "Methane storms control Titan's dune orientation". *Nature Geoscience*, 2015
- 18) N. Marounina, G. Tobie, S. Carpy, J. Monteux, **B. Charnay** and O. Grasset. "Evolution of Titan's Atmosphere during the Late Heavy Bombardment". *Icarus*, 2015.
- 19) Lucas, S. Rodriguez, C. Narteau, **B. Charnay**, S. Courrech du Pont, T. Tokano, A. Garcia, M. Thiriet, A. Hayes, R. Lorenz and O. Aharonson, . "Growth mechanisms and dune orientation on Titan". *Geophysical Research Letters*, 2014.
- 20) **B. Charnay**, F. Forget, G. Tobie, C. Sotin and R. Wordsworth. "Titan's past and future: 3D modeling of a pure nitrogen atmosphere and geological implications". *Icarus*, 2014

- 21) Richard, N. Rambaux and **B. Charnay**. "Librational response of a rigid three-layer Titan". *Planetary and Space Science*, 2014.
- 22) J. Leconte, F. Forget, **B. Charnay**, R. Wordsworth and A. Pottier. "Increased insolation threshold for runaway greenhouse processes on Earth-like planets". *Nature*, 2014.
- 23) **B. Charnay**, F. Forget, R. Wordsworth, J. Leconte, E. Millour, F. Codron and A. Spiga. "Exploring the faint young Sun problem and the possible climates of the Archean Earth with a 3D GCM". *Journal of Geophysical Research (Atmosphere)*, 2013.
- 24) J. Leconte, F. Forget, **B. Charnay**, R. Wordsworth, F. Selsis, E. Millour and A. Spigae. "3D climate modeling of close-in land planets: Circulation patterns, climate moist bistability and habitability". *Astronomy & Astrophysics*, 2013.
- 25) R. Lorenz, C. Newman, T. Tokano, J. Mitchell, **B. Charnay**, S. Lebonnois and R. Achterberg. "Formulation of a wind specification for Titan late polar summer exploration". *Planetary and Space Science*, 2012.
- 26) **B. Charnay** and S. Lebonnois. "Two boundary layers in Titan's lower troposphere inferred from a climate model". *Nature Geoscience*, 2012.
- 27) S. Lebonnois, J. Burgalat, P. Rannou and **B. Charnay**. "Titan global climate model: A new 3-dimensional version of the IPSL Titan GCM". *Icarus*, 2012.
- 28) R. Wordsworth, F. Forget, E. Millour, J. Head, J.-B. Madeleine, and **B. Charnay** "Global modelling of the early Martian climate under a denser CO₂ atmosphere: Water cycle and ice evolution". *Icarus*, 2012.
- 29) R. Wordsworth, F. Forget, F. Selsis, E. Millour, **B. Charnay**, and J.-B. Madeleine. "Gliese 581d is the First Discovered Terrestrial-mass Exoplanet in the Habitable Zone". *The Astrophysical Journal Letter*, 2011.
- 30) M. Galand, L. Moore **B. Charnay**, I. Mueller-Wodarg and M. Mendillo. "Solar primary and secondary ionization at Saturn". *Journal of Geophysical Research (Space Physics)*, 2009.