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Education

- 2007** **Ph.D. in Planetary Science**, Universite de Nantes, France
2004 **M. Sc. in Earth Science**, Universite Blaise Pascal, Clermont Ferrand, France
2002 **B. Sc. In Earth Science**, Universite Pierre et Marie Curie, Paris, France

Professional Experience

- 2010-present** Scientist, Jet Propulsion Laboratory, Caltech
2007-2010 NASA Postdoctoral Fellow, JPL, Caltech
2004-2007 PhD candidate, Teaching assistant, Universite de Nantes, France

Research Interests

- Physical and chemical properties of icy materials: measurement, modeling, and planetary applications
- Origin, interior structure and dynamics of icy solar system bodies
- Chemical composition and evolution of planetary surfaces and interiors

Awards

NASA Postdoctoral Fellowship, 2007

Professional Organizations

American Astronomical Society, Division of Planetary Science
American Geophysical Union

Service

- Castillo-Rogez J.C., Durham W.B., Noir J., Vance S., **Choukroun M.**, McCarthy C., Barmatz M. “Laboratory studies in support for space missions”, white paper submitted to the NRC Planetary Science Decadal Survey.
- 6th Asia-Oceania Geosciences Society meeting, Singapore, Aug 11-15, 2009: *Session chair* for the PS09-15 “Planetary Ices and Astrobiology” session, Aug 13th.
- 41st American Geophysical Union Fall meeting, San Francisco, CA, Dec 14-18, 2009:
- session convener: P23 “Physics and Chemistry of Ices: from the Laboratory to the Planetary Scale”
 - chair for the oral session on Dec 15th, 2009.

Manuscript reviews: *High Pressure Research* (2), *Icarus* (1), *Proceedings of the 12th International Conference on the Physics and Chemistry of Ice* (1), *Astrophysical Journal* (1), Chapter (1) for *Science of Solar System Ices*, 3rd Ed.

Invited talks & Seminars

- « Geophysics of Icy Satellites: insights from experimental studies of the mechanical properties of ices and the rheology of icy slurries » *Tectonics Seminar series*, UCLA, April 2011.
- « Phase behaviour of ices and hydrates – planetary implications for icy satellites. » Invited talk, *AGU Fall Meeting*, San Francisco, December 2010.
- « Clathrate hydrates in the presolar nebula: on the delivery of volatiles to outer Solar System objects. » Invited talk, *Workshop on the Formation of Planets and Satellites*, Pasadena, October 2010.
- « Exchange processes on icy satellites: insights from laboratory measurements. » *Postdoctoral seminar series*, JPL, February 2010.
- « Ice Viscoelasticity at Icy Satellites Tidal Frequencies. » by Castillo, Choukroun, Young, Engelhardt, Mielke. (talk given by Choukroun) *Asia-Oceania Geosciences Society 6th Meeting*, Singapore, August 2009.
- « The origin and evolution of Titan. » by Lunine, Choukroun, Stevenson, Tobie. (talk given by Choukroun) *Titan from Cassini-Huygens symposium*, Corpus Cristi, TX, July 2008.
- « Experimental and thermodynamic study of hydrates under pressure: Applications to Titan. » *Planetary Ices seminar series*, JPL, March 2007.
- « Stability and structure of methane hydrates under pressure: Implications for Titan's cryovolcanism. » by Choukroun, Morizet, Grasset. Invited talk, *3rd European Union General Assembly*, Vienna, Austria, April 2006.

Publications

Articles and book chapters

- Choukroun M.**, Chevrier V., Kieffer S., Lu X., Tobie G. (in press). *Clathrate Hydrates in the outer Solar System*. Invited chapter for the upcoming edition of « Science of Solar System Ices » (Eds. Gudipati & Castillo), Springer.
- Choukroun M.**, Barmatz M., Castillo-Rogez J.C. (2011). Understanding the evolution of icy satellites through cryogenic light microscopy and Raman studies. *Microscopy and Analysis*, 25(2), 5-7.
- Choukroun M.**, Grasset O. (2010). Thermodynamic data and modeling of the water and water-ammonia phase diagrams for planetary geophysics. *J. Chem. Phys.*, 133, 144502.
- Fortes A.D., **Choukroun M.** (2010). Phase behaviour of ices and hydrates. *Space Sci. Rev.*, 153, 185-218, doi : 10.1007/s11214-010-9633-3.
- Sohl F., **Choukroun M.**, Kargel J.S., Kimura J., Pappalardo R., Vance S., Zolotov M. (2010). Subsurface water oceans within icy moons: chemical composition and exchange processes. *Space Sci. Rev.*, 153, 485-510, doi: 10.1007/s11214-010-9646-y.
- Davies A.G., Sotin C., Castillo-Rogez J., Matson D.L., Johnson T.V., **Choukroun M.**, Baines K.H. (2010). Atmospheric Control of the Cooling Rate of Impact Melts and Cryolavas on Titan's Surface. *Icarus*, doi: 10.1016/j.icarus.2010.02.025.
- Choukroun M.**, Grasset O., Tobie G., Sotin C. (2010). Stability of methane clathrate hydrates under pressure: Influence on outgassing processes of methane on Titan. *Icarus*, 205, 581-593, doi: 10.1016/j.icarus.2009.08.011.

- Lunine J.I., **Choukroun M.**, Stevenson D.J., Tobie G. (2009). *The Origin and Evolution of Titan*. In: Brown, R.H., Lebreton, J.-P., Waite, H. (Eds.), *Titan from Cassini-Huygens*, Ch. 3, pp. 35-59.
- Zhong F., Mitchell K.L., Hays C.C., **Choukroun M.**, Barmatz M., Kargel J.S. (2009). The rheology of cryovolcanic slurries: motivation and phenomenology of water-methanol slurries with implications for Titan. *Icarus*, 202, 607-619.
- Tobie G., **Choukroun M.**, Grasset O., Le Mouelic S., Lunine J.I., Sotin C., Bourgeois O., Gautier D., Hirtzig M., Lebonnois S., Le Corre L. (2009). Evolution of Titan and implications for its hydrocarbon cycle. *Philos. Trans. R. Soc. A.*, 367, 619-631.
- Choukroun M.**, Grasset O. (2007). Thermodynamic model for water and high-pressure ices up to 2.2 GPa and down to the metastable domain. *J. Chem. Phys.*, 127, 124506 (11 pages).
- Choukroun M.**, Morizet Y., Grasset O. (2007). Raman study of methane clathrate hydrates under pressure: New evidence for metastability of structure II. *J. Raman Spectrosc.*, 38, 440-451.
- Grasset O., Amiguet E., **Choukroun M.** (2005). Pressure measurements within optical cells using diamond sensors: Accuracy of the method below 1 GPa. *High Press. Res.*, 25 (4), 255-265.
- Choukroun M.**, O'Reilly S.Y., Griffin W.L., Pearson N.J., Dawson J.B. (2005). Hf isotopes in MARID (Mica-Amphibole-Rutile-Ilmenite-Diopside) rutile trace metasomatic processes in the lithospheric mantle. *Geology*, 33 (1), 45-48.

Abstracts

- Aveline D.C., Abbey W.J., **Choukroun M.**, Treiman A.H., Dyar M.D., Smrekar S.E., Feldman S.M. « Rock and mineral weathering experiments under model Venus conditions ». *42nd Lunar Planet. Sci. Conf.*, Abstract #2165, Houston, TX, March 2011.
- Castillo-Rogez J.C., **Choukroun M.**, Hodyss R.P., Johnson P.V., Rivkin A.S., Raymond C.A. « Origin of Ceres' surface as a product of mobile-lid convection ». *42nd Lunar Planet. Sci. Conf.*, Abstract #2486, Houston, TX, March 2011.
- Lynch K.L., Smith I.B., Singer K.N., Vogt M.F., Blackburn D.G., Chaffin M., **Choukroun M.**, Ehsan N., DiBraccio G.A., Gibbons L.J., Gleeson D., Jones B.A., Le Gall A., McEnulty T., Rampe E., Schrader C., Tsang C.C.C., Williamson P., Castillo J., Budney C. « The Ganymede Interior Structure and Magnetosphere Observer (GISMO) mission concept ». *42nd Lunar Planet. Sci. Conf.*, Abstract #2364, Houston, TX, March 2011.
- Choukroun M.** « Phase behavior and thermodynamic modeling of ices – Implications for the geophysics of icy satellites ». Abstract #MR31B-01, *American Geophysical Union Fall Meeting*, San Francisco, CA, Dec 2010.
- DiBraccio G.A., Vogt M.F., Blackburn D.G., Chaffin M., **Choukroun M.**, Ehsan N., Gibbons L.J., Gleeson D., Jones B.A., Le Gall A., Lynch K.L., McEnulty T., Rampe E., Schrader C., Singer K.N., Smith I.B., Tsang C.C.C., Williamson P., Castillo J., Budney C. « The Ganymede Interior Structure and Magnetosphere Observer (GISMO) mission concept ». Abstract #P31B-1523, *American Geophysical Union Fall Meeting*, San Francisco, CA, Dec 2010.
- Choukroun M.**, Castillo-Rogez, J.C., Walker, C. (2010) « Effect of microstructure and deformation regimes on anelasticity of water ice – implications for Europa, Enceladus, and Titan ». *American Astronomical Society, DPS Meeting #42*, Pasadena, CA, Oct 2010.
- Choukroun M.**, Castillo-Rogez J.C., Young J.B., Mielke R.E. (2010) « Preliminary comparison of the viscoelastic properties of water ice and clathrate hydrates at low stress ». *12th International Conference on the Physics and Chemistry of Ice*, Sapporo, Japan, Sept 2010.
- Castillo-Rogez J.C., **Choukroun M.** (2010) « Microstructural mechanisms driving attenuation at the low-stress and low-frequency conditions of planetary tides ». *12th International Conference on the Physics and Chemistry of Ice*, Sapporo, Japan, Sept 2010.
- Choukroun M.**, Castillo-Rogez J.C., Young J.B., Mielke R.E. (2010) « Preliminary comparison between the dissipation in CO₂ clathrate hydrates and water ice ». *41st Lunar Planet. Sci. Conf.*, Abstract #2172, Houston, TX, March 2010.

- Choukroun M.**, Castillo-Rogez J.C., Young J.B., Mielke R.E. « Preliminary measurements of the attenuation properties of polycrystalline water ice and CO₂ clathrate hydrates ». *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract P21B-1218, San Francisco, CA, Dec 2009.
- Castillo-Rogez J.C., McCarthy C., **Choukroun M.**, Rambaux N. « New model for Europa's tidal response based after laboratory measurements ». *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract P53B-07, San Francisco, CA, Dec 2009.
- Grasset O., **Choukroun M.** « Stability domains of water ices in the NH₃-H₂O system: experimental results and thermodynamic modeling ». *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract P21B-1218, San Francisco, CA, Dec 2009.
- Sotin C., Mielke R., **Choukroun M.**, Neish C., Barmatz M., Mitchell K. « Laboratory experiments on the interaction between ice and hydrocarbons: implications for the formation of lakes on Titan ». *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract P54C-06, San Francisco, CA, Dec 2009.
- Choukroun M.**, Castillo-Rogez J.C., Young J.B., Mielke R.E., Engelhardt H., Sotin C. « Preliminary comparison between the attenuation properties of polycrystalline water ice and CO₂ clathrate hydrates ». *American Astronomical Society, DPS meeting #41*, #61.08, Fajardo, PR, October 2009.
- Castillo J., **Choukroun M.**, Young J., Engelhardt H., Mielke R. « Ice Viscoelasticity at Icy Satellites Tidal Frequencies. » *Asia-Oceania Geosciences Society 6th Meeting*, Singapore, August 2009.
- Choukroun M.**, Grasset O., Tobie G., Sotin C. « Stability of clathrates under pressure : Implications for methane outgassing on Titan. » *Asia-Oceania Geosciences Society 6th Meeting*, Singapore, August 2009.
- Sotin C., Mielke R., **Choukroun M.**, Neish C., Barmatz M., Lunine J.I., Mitchell K. « Interaction of Liquid Hydrocarbons on H₂O ice : Implications for Titan. » *Asia-Oceania Geosciences Society 6th Meeting*, Singapore, August 2009.
- Choukroun M.**, Barmatz M., Castillo J., Sotin C. « New growth setup for planetary clathrate hydrate analogs for physical properties measurements ». *40th Lunar Planet. Sci. Conf.*, Abstract #2303, Houston, TX, March 2009.
- Sotin C., Mielke R., **Choukroun M.**, Neish C., Barmatz M., Castillo J., Lunine J.I., Mitchell K.L. « Ice-hydrocarbon interactions under Titan-like conditions : implications for the carbon cycle on Titan ». *40th Lunar Planet. Sci. Conf.*, Abstract #2088, Houston, TX, March 2009.
- Castillo-Rogez J., **Choukroun M.**, Young J., Zhong F.; Engelhardt H., Barmatz, M. « New Laboratory-Based Attenuation Measurements on Ice to Support Tidal Heating Models. » *41st American Geophysical Union Meeting*, San Francisco, CA, Dec. 2008.
- Choukroun M.**, Barmatz M., Castillo J., Sotin C. « New growth setup for planetary clathrate hydrate analogs ». *Workshop on the Science of Solar System Ices*, Oxnard, CA, May 2008.
- Choukroun M.**, Grasset O., Sotin C., Tobie G. « Cryovolcanic release of methane on Titan : experimental constraints from their stability in presence of ammonia ». *39th Lunar and Planetary Science Conference*, Houston, Texas, March 2008.
- Choukroun M.**, Le Menn E., Tobie G., Grasset O., Sotin C. « Dissociation of methane clathrate hydrates and cryovolcanism on Titan: Experimental constraints. » *40th American Geophysical Union Meeting*, San Francisco, California, December 2007.
- Davies, A., Matson, D.L., Sotin, C., **Choukroun, M.**, Johnson, T.V., Baines, K.H. « The Role of Titan's Atmosphere in Removing Heat from a Cryolava Flow. » *American Astronomical Society DPS meeting #39*, #63.05; Bull. Am. Astron. Soc. 39, 543, Orlando, FL, Oct 2007.
- Tobie G., **Choukroun M.**, Gautier D., Grasset O., Hersant F., Le Corre L., Le Mouélic S., Lunine J.I., Mitri G., Rannou P., Rodriguez S., Sotin C. « Release of volatiles from Titan's interior : Origin, Evolution and Consequences ». *4th European Union General Assembly*, Vienna, Austria, April 2007.
- Choukroun M.**, Grasset O., Le Menn E., Morizet Y., Tobie G. « Methane clathrate hydrates stability during cryovolcanic processes : Evidence from their experimental study in the H₂O-NH₃-CH₄ system ». *38th Lunar and Planetary Science Conference*, Houston, Texas, March 2007.

- Choukroun M.**, Le Menn E., Morizet Y., Grasset O. « Expérimentation haute pression - basse température des systèmes glacés : Apports en planétologie. » *5^e Forum technologique des hautes pressions*, Monthieux, France, November 2006.
- Grasset O., Amiguet E., **Choukroun M.**, Morizet Y. « Métrologie du diamant en cellule optique sous moyenne pression : Tests et Applications. » *5^e Forum technologique des hautes pressions*, Monthieux, France, November 2006.
- Choukroun M.**, Morizet Y., Pargamin J., Grasset O. « Expérimentation haute-pression basse température des systèmes H₂O-NH₃, H₂O-CH₄ et H₂O-NH₃-CH₄ : Applications à la dynamique de Titan. » *Forum du Programme National de Planétologie*, Nancy, France, September 2006.
- Tobie G., **Choukroun M.**, Grasset O., Le Mouëlic S., Mocquet A., Rodriguez S., Sotin C. « Activité cryovolcanique à la surface de Titan : Observation et modélisation. » *Forum du Programme National de Planétologie*, Nancy, France, September 2006.
- Choukroun M.**, Morizet Y., Grasset O. « How does cryovolcanism work on Titan ? Some clues from the experimental study of methane hydrates under pressure. » *Asia-Oceania Geosciences Society 3rd Meeting*, Singapore, July 2006.
- Choukroun M.**, Morizet Y., Grasset O. « Stability and structure of methane hydrates under pressure: Implications for Titan's cryovolcanism. » *3rd European Union General Assembly*, Vienna, Austria, April 2006.
- Choukroun M.**, Tobie G., Grasset O. « Ammonia, a methane hydrate inhibitor – Implications for Titan's atmospheric methane ». *37th Lunar and Planetary Science Conference*, Houston, Texas, March 2006.
- Choukroun M.**, Grasset O., Morizet Y. « Stability of methane clathrates up to 1 GPa : Preliminary results. » *Joint 20th AIRAPT- 43rd EHPRG Meeting*, Karlsruhe, Germany, June 2005.
- Grasset O., Pargamin J., **Choukroun M.** « The high-pressure phase diagram of the ammonia-water system : implications for Titan. » *Joint 20th AIRAPT- 43rd EHPRG Meeting*, Karlsruhe, Germany, June 2005.
- Grasset O., Pargamin J., **Choukroun M.** « Une cellule optique à enclumes de saphir pour l'étude des mélanges hydratés dans la gamme 0-1 GPa. » *4^e Forum technologique des hautes pressions*, Messigny, France, November 2004.