SYLVAIN PIQUEUX

Planetary and Exoplanetary Atmospheres, Jet Propulsion Laboratory
Phone: 818-393-9595 Fax: 818-354-2494 Sylvain.Piqueux@jpl.nasa.gov

Dr. Sylvain Piqueux is a Research Scientist at JPL/Caltech. His work focuses on characterizing planetary surface processes to constrain the geological history of the Solar System, with an emphasis on volatiles at the surfaces of Mars, the Moon, and Europa. He is an expert with thermal infrared data analysis and thermophysical modeling. He is an active science team member of multiple NASA missions, and the PI of several NASA-funded grants.

EDUCATION

Ph.D.	Planetary Sciences	Arizona State University	2009
M.S.	Geodynamics	Ecole Normale Supérieure, France	2003
M.S.	Sedimentary Basin Modeling	University of Paris VI, France	2003

PROFESSIONAL EXPERIENCE

Research Scientist	JPL/ California Institute of Technology	2015-present
Post-doctoral Researcher	JPL/ California Institute of Technology	2013-2014
Program Associate	AAAS, Washington, DC	2012
Post-doctoral Researcher	Arizona State University	2010-2011

MISSION EXPERIENCE

Europa Clipper	**E-THEMIS Co-I** (*2016-present*) and **Investigation Scientist** (2018-present) Thermal Modeling Algorithm Development
Mars Reconnaissance Orbiter	**MCS Co-I** (*2013-present*) Data Analysis, Surface Observation Campaign Design
InSight	**Council of Terrains:** Landing Sites Thermophysics (*2013-2018*) Instrument Site Selection Working Gr. -ISSWG- Member (*2014-2018*) ISSWG **Collaborator** (2014-present)
Mars Odyssey	**THEMIS Co-I** *(2004-present)* Data Analysis, *Ad Hoc* Observation Campaign Design
Mars 2020	**Council of Terrains:** Landing Sites Thermophysics (*2016-present*) **JPL Tasks**: *Ad Hoc* Planetary Protection & Sample Integrity Assessment (*2016*)
Lunar Reconnaissance Orbiter	**Diviner Science Team Member** (*2015-2018*) Data Analysis
Mars Science Laboratory	**Science Team Member** (*2015-2017*) REMS Data Analysis
Mars Global Surveyor	**TES Science Team Member** (*2004-2006*) Data Analysis

SELECTED RESEARCH AWARDS

Program	*Role*	*Period*	*Budget*
Solar System Workings	PI	2016-2019	$402k
Planetary Data Archiving, Restoration, and Tools	PI	2016-2019	$545k
Critical Data Product, Mars 2020 Landing Site Char.	Co-I	2016-2018	$200k
Critical Data Product, InSight Landing Site Char.	Sci. PI	2016-2018	$120k
Mars Data Analysis	PI	2015-2018	$331k
Mars Fundamental Research	Sci. PI	2010-2013	$300k*
Mars Fundamental Research	Sci. PI	2007-2010	$300k*
Critical Data Product, Phoenix Landing Site Monitoring	Co-I	2006	$ 30k*

*: Estimation

SELECTED PROFESSIONAL SERVICE AND AWARDS

Panelist/Reviewer:	Mars Data Analysis	
	Outer Planet Research	
	Planetary Geology and Geophysics	
	Solar System Workings	
	NASA Postdoctoral Program	
	Mars Fundamental Research	
	Planetary Instrument Definition and Development	
Journal Reviewer:	Journal of Geophysical Research-Planets	
	Icarus	
	Nature–Geosciences	
	Geophysical Research Letters	
	Remote Sensing of the Environment	
Prizes/Awards:	NASA Early Career Public Achievement Medal	2018
	JPL Lew Allen Award for Excellence	2017
	JPL Voyager Award	2016
	Icarus Outstanding Reviewer Award	2015
	Antarctica Service Medal - US Dept. of Defense	2012
	Merit Prize Univ. Paris VI, France	2002
	Student Prize - Commissariat Energie Atomique (CEA), France	1995
Organization/Chair:	AGU Fall Meeting, USA	2016-2017
	DPS 48 / EPSC 11, USA	2016
	6th Int. Mars Pol. Sci. and Exploration, Iceland	2016
	3rd Int. Workshop Mars Pol. Ener. Balance, USA	2009
Advising/Mentoring	Peter Buhler (NPP)	2018-present
	Jon Bapst (JPL)	2018-present

PRESS RELEASES

Test for Damp Ground at Mars' Seasonal Streaks Finds None	2016	https://www.jpl.nasa.gov/news/news.php?feature=6597
Frosty Cold Nights Year-Round on Mars May Stir Dust	2016	https://www.jpl.nasa.gov/news/news.php?feature=6564

PUBLICATIONS

Piqueux, S., Buz, J., Edwards, C.S., Bandfield, J.L., Kleinböhl, A., Kass, A.M., Hayne, P.O., and the MCS and THEMIS teams, Widespread Shallow Water Ice on Mars at High and Mid Latitudes, *In Revision GRL*.

Mischna, A.. M. and **S. Piqueux**, The Role of Atmospheric Pressure on Mars Surface Properties and Early Mars Climate Modeling, *In Revision Icarus.*

Vu, T. H., **Piqueux, S.**, Choukroun, M., Edwards, C.S., Chritensen, P.R., Glotch, T.D., (2019), Low-temperature specific heat capacity measurements and application to Mars thermal modeling, Icarus, 321, 824-840, doi: 10.1016/j.icarus.2018.10.004.

Morgan, P., Grott, M., Knapmeyer-Endrun, B., Golombek., M., Delage, P., Loignonne, P., **Piqueux, S.**, + 10 colleagues, (2018), A Pre-Landing Assessment of Regolith Properties at the InSight Landing Site, Space Sci. Rev., 214, 6, UNSP 104.

Golombek, M., + 45 colleagues, (2018), Geology and Physical Properties Investigations by the InSight Lander, Space Sci. Rev., 214, 5, UNSP 84.

Smith, I., Diniega, S., Beaty, D., Thorsteinssan, T., Becerra, P., Bramson, A., Clifford, S., Hvidberg, C. Portyankina, C., **Piqueux, S.**, Spiga, A., Titus, T., (2018), 6th international conference on Mars polar science and exploration: Conference summary and five top questions, Icarus, 308, 2-14, doi: 10.1016/j.icarus.2017.06.027.

Edwards, C., **Piqueux, S.**, Hamilton, V., Fergason, R., Herkenhoff, K., Vasavada, A., Bennett, K., Sacks, L., Lewis, K., Smith, M., (2018), The Thermophysical Properties of the Bagnold Dunes, Mars: Ground-Truthing Orbital Data, J. Geophys. Res., 123, 5, 1307-1326, doi:10.1029/2017JE005501.

Heavens, N., Kleinböhl, A., Chaffin, M., Halekas, J.S., Kass, D.M., Hayne, P.O., McCleese, D.J., **Piqueux, S.**, Shirley, J.H., and J.T. Schofield, Enhanced hydrogen escape from Mars's atmosphere because of deep convection in dust storm (2018), Nature Astronomy, 2, 2, 126-132, doi: 10.1038/s41550-017-0353-4.

Golombek, M., Kipp, D., Daubar, I.J., Fergason, R., Kirk, R.L., Beyer, R., Huertas, A., **Piqueux, S.**, + 26 colleagues, (2017), Selection of the InSight Landing Site, Space Sci. Rev., 211,1-4,5-95, doi: doi.org/10.1007/s11214-016-0321-9.

Siegler, M.A., Smekar, S.E., Grott, M., **Piqueux, S.**, Mueller, N., Williams, J.-P., Plesa, A.-C., Spohn, T., (2017), The InSight Mars Lander and Its Effect on the Subsurface Thermal Environment, Space Sci. Rev., 211,1-4,259-275, doi: doi.org/10.1007/s11214-017-0331-2.

Schaible, M., Johnson, R., Zhigilei, Z., **Piqueux, S.**, (2017), High energy electron sintering of icy regolith: formation of the PacMan anomalies at Saturn, *Icarus*, *285*, 211-223, doi: 10.1016/j.icarus.2016.08.033.

Vasavada, A. R., **S. Piqueux**, K. W. Lewis, M. T. Lemmon, M. D. Smith, (2017), Thermophysical properties along *Curiosity*'s traverse in Gale crater, Mars, derived from the REMS ground temperature sensor, *Icarus*, *284*, 372-386, doi: 10.1016/j.icarus.2016.11.035.

Piqueux, S., Kleinböhl, A., Hayne, P., Heavens, N., Kass, D., McCleese, D., Schofield, J., Shirley, J., (2016), Discovery of a widespread low-latitude diurnal CO_2 frost cycle on Mars, *J. Geophys. Res.*, *121*, 1174-1189, doi:10.1002/2016JE005034.

Edwards, C., **Piqueux,** S., The Water Content of Recurring Slope Lineae on Mars, (2016), *Geophys. Res. Let.*, *43*, 8912-8919, doi:10.1002/2016GL070179.

Plesa, A., Grott, M., **Piqueux**, S., Sielger, Interannual Variability of the Martian Surface Planetary Heat Flow Due to Dust Loading of the Atmosphere, (2016), *J. Geophys. Res.*, *121*, 2166-2175, doi:10.1002/2016JE005127.

Piqueux, S., Byrne, S., Titus, Timothy, Hansen' Candice, Kieffer H., (2015), Enumeration of Mars Years since the Beginning of the Telescopic Exploration, *Icarus*, *251, 332-338*.

Heavens, N., Cantor, B., Hayne, P., Kass, D., Kleinboehl, K., McCleese., D., **Piqueux**, S., Schofield, J., Shirley J., (2015), Extreme Detached Dust Layers near Martian Volcanoes: Evidence for Dust Transport by Mesoscale Circulations Forced by High Topography, *Geophys. Res. Let*., 42, 10, 3730-37-38, doi: 10.1002/2015GL064004.

Piqueux, S., Kleinböhl, A., McCleese, D., Hayne, P., Schofield, T., Kass, D., (2015), Variability of the martian seasonal CO_2 cap extent over eight mars years, *Icarus, 251, 164-180* doi: 10.1016/j.icarus.2014.10.045.

Brown, A., **Piqueux**, S., Titus, T., (2014), A H_2O ice cycle on the CO_2 ice south polar cap of Mars, *Earth Plan. Sci. Let.*, *406, 102-109,* doi: 10.1016/j.epsl.2014.08.039.

Piqueux, S., and P.R. Christensen, (2012), Visible and thermal infrared observations of the Martian surface during three Phobos shadow transits, *Geophys. Res. Let.*, doi:10.1029/2012GL053352.

Piqueux, S., and P.R. Christensen (2011), Temperature-dependent thermal inertia of homogeneous Martian regolith, *J. Geophys. Res.*, *116*, E7, doi:10.1029/2011JE003805.

Piqueux, S., and P. R. Christensen (2009), A model of thermal conductivity for planetary soils: 1. Theory for unconsolidated soils, *J. Geophys. Res.*, *114*, E9, doi:10.1029/2008JE003308.

Piqueux, S., and P.R. Christensen (2009), A model of thermal conductivity for planetary soils: 2. Theory for cemented soils, *J. Geophys. Res.*, *114*, E9, doi:10.1029/2008JE003309.

Piqueux, S., C.S. Edwards, and P.R. Christensen (2008), Distribution of the ices exposed near the south pole of Mars using Thermal Emission Imaging System (THEMIS) temperature measurements, *J. Geophys. Res.*, *113*, E8, doi:10.1029/2007JE003055.

Piqueux, S., and P. R. Christensen (2008), North and south sub-ice gas flow and venting of the seasonal caps of Mars: A major geomorphological agent, *J. Geophys. Res.*, *113*, E6, doi:10.1029/2007JE00 3009.

Piqueux, S., and P.R. Christensen (2006), Deposition of CO_2 and erosion of the Martian south perennial cap between 1972 and 2004: Implications for current climate change, *J. Geophys. Res., 113*, E2, E02006, doi: 10.1029/2007JE002969**.**

Piqueux, S., S. Byrne, and M. I. Richardson (2003), Sublimation of Mars's southern seasonal CO_2 ice cap and the formation of spiders, *J. Geophys. Res.*, *108*, E8, doi:10.1029/2002JE002007.

PRESENTATIONS (FIRST AUTHOR ONLY)

Piqueux, S., Buz, J., Edwards, C.S., Bandfield, J.L., Kleinböhl, A., Kass, A.M., Hayne, P.O., and the MCS and THEMIS teams, Widespread Shallow Water Ice on Mars at High and Mid Latitudes, (2019), Eos Trans. AGU, Fall Meet., Suppl. #P23C-2737.P54A-07.

Piqueux, S., Buz, J., Edwards, C.S., Bandfield, J.L., Kleinböhl, A., Kass, A.M., Hayne, P.O., and the MCS and THEMIS teams, Widespread Shallow Water Ice on Mars at High and Mid Latitudes, (2019), 9th Int. Conf. on Mars, Pasadena, California, #2089.

Piqueux, S., Vu, T., Choukroun, M., Garvie, L., Edwards, S., (2019), Specific Heat Capacity of a Suite of Meteorites and Mineral Endmembers between 100 and 285K - Implications for Planetary Thermal Modeling, Thermal Models for Planetary Science III, Budapest, Hungary.

Piqueux S., Edwards C. S., Fergason R., L. Laura J., Weintraub A., et al., (2018), Improving Thermal Model Capability for the Planetary Science Community, XLIX Lunar Plan. Sci. Conf., LPI, Houston, #1027.

Piqueux, S., Kass, D.M., Kleinboehl, A., Hayne, P.O., Heavens, N.G., McCleese, D.J., Schofield, J.T., Shirley, J.H., (2017), Dedicated Low Latitude Diurnal CO_2 Frost Observation Campaigns by the Mars Climate Sounder, Eos Trans. AGU, Fall Meet., Suppl. #P23C-2737.

Piqueux, S., A. Kleinböhl, P. O. Hayne, N. G. Heavens, D. M. Kass, D. J. McCleese, J. T. Schofield, J. H. Shirley, (2017): Widespread Low-Latitude Diurnal CO_2 Frost on Mars, XLVIII Lunar Plan. Sci. Conf., LPI, Houston, #1485.

Piqueux, S., A. Kleinböhl, P. Hayne, D. Kass, J. Schofield, D. McCleese, M. Richardson, (2017), Near-Surface Non-Condensable Gas Enrichment in the Martian Polar Regions from MCS Surface Observations, 6th Int. Workshop Mars Atm.: Modelling and Obs., Granada, Spain.

Piqueux, S., P. Hayne, A. Kleinböhl, C. Edwards, C. Elder, N. Heavens, D. Kass, D. McCleese, J. Schofield, J. Shirley, M. Smith (2016), Global Surface Dust Distribution Changes on Mars (MY 28-33), Eos Trans. AGU, Fall Meet., Suppl. #P21A-20174.

Piqueux, S., and the Diviner Team, (2016)**,** Depth-Dependency of Lunar Regolith Thermophysical Properties from Transient Shadows Observed by Diviner, XXXXVII Lunar Plan. Sci. Conf., LPI, Houston, #1762.

Piqueux, S., and the MCS Team: A widespread low-latitude diurnal CO_2 frost cycle on Mars revealed by Mars Climate Sounder observations (2015), Eos Trans. AGU, Fall Meet., Suppl. #P22A-03.

Piqueux, S., Kleinböhl, A., McCleese, D., Hayne, P., Schofield, T., Kass, D., and the MCS Team: Thermal Inertia Mapping Using Mars Climate Sounder Measurements., (2014), Eos Trans. AGU, Fall Meet. Suppl. #P33A-4021.

Piqueux, S., Kleinböhl, A., McCleese, D., Hayne, P., Schofield, T., Kass, D., and the MCS Team: Tracking the Seasonal Caps of Mars over Eight Mars Years, (2013), Eos Trans. AGU, Fall Meet. Suppl., #P31C-06.

Piqueux, S., (2013), Thermophysical Modeling and Measurements of Martian-Like Particulated Materials: Effect of Temperature and Cementing Phases, Jet Propulsion Laboratory, Mars Seminar.

Piqueux S. and P. Christensen: (2012), *invited*, Radiometric determination of particulate material thermal conductivity between 77-300K at-and-below atmospheric pressure, Eos Trans. AGU, Fall Meet. Suppl. #P11F-08.

Piqueux, S., (2011), *invited*, Exploring the Surface of Mars with Thermal Infrared Data, University of California Riverside, Department of Earth Science Seminar.

Piqueux S. and P.R. Christensen (2009), Basal Sublimation and Venting of the North Translucent ("Cryptic") Seasonal Cap, 3rd Int. Workshop on Mars Pol. En. Bal. & CO_2 Cycle, LPI, Seattle, #7001.

Piqueux, S., Edwards, C., Christensen, P.R., (2009) Summer Surface Temperatures of the North Polar Region of Mars as Measured by THEMIS, Eos Trans. AGU, 90(52), Fall Meet. Suppl., # P43D-1466.

Piqueux S. and P.R. Christensen (2007), Recent Deposition of CO_2 and Erosion of the South Polar Cap: Implications for Climate Change, 7th Intern. Conf. Mars, Caltech, Pasadena, #3068.

Piqueux, S., and P.R. Christensen, (2007), Basal sublimation and venting of the north seasonal cap of Mars, Eos

Trans. AGU, 88(52), Fall Meet. Suppl., # P11A-0258.

Piqueux S. Christensen, P.R., (2007), Basal Sublimation of the Seasonal Caps and Sub-Ice Gas Flow: A Major Geomorphological Agent in the Martian Polar Regions, 7th Intern. Conf. Mars, Pasadena, #3069, 2007.

Piqueux S., Christensen, P.R., Mapping the Exposed Water Ice and CO_2 Perennial Cap Around the South Pole of Mars with THEMIS Visible and Infrared Data, XXXVI Lunar Plan. Sci. Conf., LPI, Houston, #1163, 2006.

Piqueux, S., Edwards, C., Fergason, R., Christensen, P.R., (2006), Exposed Surface and Subsurface Material around the South Pole of Mars, Eos Trans. AGU, 87(52), Fall Meet. Suppl., # P31A-0119.

Piqueux, **S.**, Byrne, S., and M.I. Richardson (2003), Polygonal landforms at the South Pole and implications for exposed water ice, 6th Intern. Conf. Mars, Caltech, Pasadena, #3275.