

MANUELA GIROTTO, Ph.D.

*Assistant Professor at Environmental Science and Policy Management Department,
University of California, Berkeley
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RESEARCH INTERESTS

Hydrologic response and interaction between natural and human driven processes, land surface remote sensing and multi-sensor, -spectrum, -resolution data assimilation; hydrology contribution to sea level change, snow hydrology.

EDUCATION

- **University of California, Los Angeles (UCLA)**
***Ph.D in Civil and Environmental Engineering** 2009-2014*
Dissertation title: "A snow water equivalent reanalysis approach to explore spatial and temporal variability of the Sierra Nevada snowpack"
- **Università degli studi di Padova, Padova (Italy)**
***MS in Civil and Environmental Engineering** 2005-2008*
Dissertation title: "Analysis of the historic data and estimation of the recharge of a groundwater basin in California."
- **Università degli studi di Padova, Padova (Italy)**
***BS in: Civil and Environmental Engineering** 2002-2005*
Dissertation title: "Analysis of a contaminated groundwater basin in an Industrial Area in Villorba, Treviso"

PROFESSIONAL EXPERIENCE

- **University of California, Berkeley–Environmental Science and Policy Management**
Assistant Professor 2019-present
- **Global Modeling and Assimilation Office, Goddard Space and Flight Center (NASA)**
Research Scientist 2014 – 2019
- **University of California, Los Angeles - Civil and Environmental Engineering**
Research Assistant 2009 - 2014
- **Università degli studi di Padova - Numerical Methods Department**
Research Assistant 2007 – 2008
- **Università degli studi di Padova – Hydraulics, Environmental and Geotechnical Engineering Department**
Research Assistant April 2005 – October 2005

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- **G&T S.R.L. Environmental and Geotechnical Engineering (Treviso, Italy)**
Part-time consultant, AutoCad designer and FeFlow Modeler **2005-2007**
- **Geoservizi S.R.L. Geology Society (Treviso, Italy)**
Part-time consultant, and AutoCad designer **2005**

TEACHING EXPERIENCE

- **UCB ESPM 172 – Remote Sensing of the Environment**
Instructor Fall 2019
- **UCLA – CEE150 - Introduction to Hydrology**
Teaching Associate (and Assistant) **Fall 2012 (and Fall 2011, Fall 2010)**
- **UCLA – CEE103 - Applied Numerical Computing and Modeling**
Teaching Associate **Spring 2012**
- **UCLA – CEE 157M - Hydrology of Mountain Watershed**
Graduate Student Assistant **Spring 2011**
- **Centro Studi e Formazione, Treviso, Italy - Static, Dynamics and Geometry**
High School Teacher **2004 - 2006**

FUNDING

- (Pending) **Sea Level Change - 2019 Science Team** **2020-2024**
“Combining multi-satellite observations, modeling and Earth system data assimilation for understanding observed and projected sea level change” (*role: co-I, \$315K*)
- (Pending) **USDA-Agriculture and Food Research Initiative - Foundational and Applied Science** **2020-2023**
“Improving Forest Fire Prediction with DATAFUME (Data Assimilation and Thermal Application for Fuel Moisture)” (*role: co-I, \$50K*)
- (Pending) **SMAP-2019 Science Team** **2020-2023**
“Identifying global controls on vegetation productivity through SMAP” (*role: PI, \$18K*)
- (Pending) **ROSES-2019 GRACE-FO Science Team** **2020-2024**
“A multivariate data assimilation approach to investigate water storage and vegetation recovery after a drought” (*role: PI, \$671K*)
- (Awarded) **ROSES-2019 Understanding Changes in High Mountain Asia. 2020-2023**
“Subseasonal to Seasonal Forecasts in High Mountain Asia: Improving forecast skill for water resources and hazard management” (*role: PI, \$953K*)
- (Awarded) **ROSES-2017, Terrestrial Hydrological Program** **2018-2020**
“An improved understanding of human-driven changes to the hydrological cycle via multivariate assimilation of soil moisture and terrestrial water storage” (*role: PI, \$385K*)

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- (Awarded) **ROSES-2016, Sea Level Change Team** **2017-2019**
"Understanding current and projected sea level change with multi-satellite observations, modeling and climate system assimilation" (role: **Co-I, \$80K**)
- (Awarded) **NASA Earth and Space Science Fellowship Program** **2011-2014**
"Spatial and Temporal Analysis of Sierra Nevada Snowpack Using a Fractional Snow Covered Area Data Assimilation Approach" (role: **PI, \$90K**)

PEER REVIEW PUBLICATIONS

- Lievens, H., ... , **M. Giroto**, et al.,(2019). Snow depth variability in the Northern Hemisphere mountains observed from space. *Nature communications*, 10(1), 1-12.
- **Giroto M.**, R. H. Reichle, M. Rodell, Q. Liu, S. Mahanama, G. De Lannoy (2019) "Multi-sensor assimilation of SMOS brightness temperature and GRACE terrestrial water storage observations for soil moisture and shallow groundwater estimation". *Remote Sensing of the Environment*, doi: 10.1016/j.rse.2019.04.001
- Oaida C., J. T. Reager; K. M. Andreadis; C. H. David; S. R. Levee; T. H. Painter; K. J. Bormann; A. R. Trangsrud; **M. Giroto**; J. S. Famiglietti (2019) "A high-resolution data assimilation framework for snow water equivalent estimation across the Western United States and validation with the Airborne Snow Observatory". *Journal of Hydrometeorology*, 20(3), 357-378.
- Getirana A., S. Kumar, **M. Giroto**, M. Rodell (2017). "Rivers and floodplains as key components of global terrestrial water storage variability", *Geophysical Research Letters*, doi: 10.1002/2017GL074684
- Reichle, R. H., and Coauthors (2017). "Global Assessment of the SMAP Level-4 Surface and Root-Zone Soil Moisture Product Using Assimilation Diagnostics", *Journal of Hydrometeorology*, doi: <https://doi.org/10.1175/JHM-D-17-0130.1>
- **Giroto M.**, G. J. De Lannoy, R. H. Reichle, S. Bhanja, M. Rodell, C. Draper, A. Mukherjee (2017). "Benefits and pitfalls of GRACE data assimilation: A case study of terrestrial water storage depletion in India", *Geophysical Research Letters*, doi:10.1002/2017GL072994
- Reichle R. H., C. S. Draper, Q. Liu, **M. Giroto** S. P. P. Mahanama, G. J. M. De Lannoy, R. D. Koster, (2017) "Land surface precipitation and hydrology in MERRA-2", *Journal of Climate*, doi:10.1175/JCLI-D-16-0720.1
- Margulis, S. A., G. Cortes, **M. Giroto**, L. S. Huning, D. Li, and M. Durand. (2016). "Characterizing the Extreme 2015 Snowpack Deficit in the Sierra Nevada (USA) Range and the Implications for Drought Recovery", *Geophysical Research Letters*, doi:10.1002/2016GL068520
- **Giroto, M.**, G. J. De Lannoy, R. H. Reichle, and M. Rodell. (2016). "Assimilation of gridded terrestrial water storage observations from GRACE into a Land Surface Model", *Water Resources Research*, doi:10.1002/2015wr018417
- Margulis, S. A., G. Cortés, **M. Giroto**, and M. Durand. (2016). "A Landsat-era Sierra Nevada (USA) Snow Reanalysis (1985-2015)". *Journal of Hydrometeorology*, doi:10.1175/JHM-D-15-0177.1

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- Cortés, G., **M. Giroto**, and S. Margulis. (2016). "Snow Process Estimation over the Extratropical Andes using a Data Assimilation Framework Integrating MERRA data and Landsat Imagery", *Water Resources Research*, doi:10.1002/2015WR018376
- Margulis, S. A., **M. Giroto**, G. Cortés, and M. Durand. (2015). "A Particle Batch Smoother Approach to Snow Water Equivalent Estimation", *Journal of Hydrometeorology*, doi:10.1175/JHM-D-14-0177.1
- **Giroto, M.**, S. A. Margulis, and M. Durand. (2014). "Probabilistic SWE reanalysis as a generalization of deterministic SWE reconstruction techniques", *Hydrological Processes*, doi:10.1002/hyp.9887
- **Giroto, M.**, G. Cortés, S. A. Margulis, and M. Durand. (2014). "Examining spatial and temporal variability in snow water equivalent using a 27 year reanalysis: Kern River watershed, Sierra Nevada", *Water Resources Research*, doi:10.1002/2014WR015346
- Cortés, G., **M. Giroto**, and S. A. Margulis. (2014). "Analysis of sub-pixel snow and ice extent over the extratropical Andes using spectral unmixing of historical Landsat imagery", *Remote Sensing of Environment*, doi:10.1016/j.rse.2013.10.023
- Barco, J., T. S. Hogue, **M. Giroto**, D. R. Kendall, and M. Putti. (2010). "Climate signal propagation in southern California aquifers", *Water Resources Research*, doi:10.1029/2009WR008376

BOOK CHAPTERS

- **Giroto M.** and M. Rodell (2018). "Water Storage". Book chapter in "Extreme Hydroclimatic Events and Multivariate Hazards in a Changing Climate", Elsevier

LEADERSHIP, SERVICE AND OUTREACH

- Associate Editor for *Water Resource Research Journal* (2017-2020)
- Co-organizer of the NASA Goddard and Space Flight Center Young Scientist Forum (2015-present). The main scope of the forum is to foster interdisciplinary research among young scientists at NASA.
- Session chair and convener for the Hydrologic Data Assimilation, American Geophysical Union Fall Meeting (2016, 2017)
- Panelist for NASA proposal review panels (2016)
- Peer-reviewer for *Journal of Geophysical Research*, *Geophysical Research Letters*, *Water Resource Research Journal*, *Advances in Water Resources Journal*, *Journal of Earth System Science*
- NASA Young ISSNAF Liaison (Italian Scientists and Scholars in North America Foundation) (2015-present)
- Volunteer judge for the Outstanding Student Paper Award at the AGU Fall Meeting 2015, 2016
- Volunteer judge at the middle and high school regional science fairs for The GLOBE Program, May 2016
- Volunteer in guided tours of the NASA Visitor Center for 6 to 12 year old children
- Outreach and sport director for the Engineering Graduate Student Association, at UCLA

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2012-2014

- Professional affiliations: *American Geophysical Union, European Geophysical Union, Italian Scientists and Scholars in North America Foundation.*

AWARDS

- ISSNAF Award for Young Investigator, 2013, 2018
- Education Abroad Program, 2007 (*Fellowship for one academic year at the University of California Los Angeles, UCLA*)
- Lions Club, Treviso, Italy, 2001. (*Development of an interactive document on today's societal diversities, 1st place*)

WORKSHOPS

- Earth Observation Summer School on Data Assimilation and Remote Sensing, European Space Agency, Frascati, Italy, 2012
- Grant application writer's workshop at Goddard Space and Flight Center, Greenbelt, MD. 3 May 2016
- Professional Skills Development Workshop for Women in Physics, Baltimore April 10 2015

COMPUTER SKILLS

Operating systems: Mac OS X, Windows and Unix

Programming Languages: Fortran (incl. parallel environments), MATLAB, R, Python

Other computer tools: LaTeX, Microsoft office, Autocad, FeFlow, ModFlow

SPOKEN LANGUAGES

Fluent in Italian and English. Basic French and Spanish

SELECTED PRESENTATIONS

- **Girotto M.**, "Land Surface Data Assimilation Using Remote Sensing Observations", KU Leuven, Jan 13th 2019. (*Invited*)
- **Girotto M.**, "Land Surface Data Assimilation Using Remote Sensing Observations", UC Merced, Feb. 12th 2019. (*Invited*)
- **Girotto M.**, Reichle R., Rodell M., Maggioni V., Forman B., Data Assimilation of Terrestrial Water Storage to Adjust Precipitation Fluxes, AGU Fall Meeting 2018, Washington DC
- **Girotto M.**, Huning L., Margulis S., Cortes G., Durand M., Estimation of Seasonal Snow Water Equivalent Using Landsat Observations, AGU Fall Meeting 2018, Washington DC. (*Invited*)
- **Girotto M.**, "Land Surface Data Assimilation for Soil Moisture, Groundwater and Snow Estimation", Science Visitor and Colloquium Program -Earth Science Seminar, Jet Propulsion Laboratory, Pasadena, CA, May 29th 2018. (*Invited*)
- **Girotto M.**, "Land Surface Data Assimilation Using Remote Sensing Observations", ESPM Seminar Series UC Berkley, May 3rd 2018. (*Invited*)

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- **Giroto M.**, “Improving Soil Moisture through the Joint Assimilation of SMOS and GRACE satellite observations”, George Mason University CEIE Seminar Series, March 28th 2018. *(Invited)*
- **Giroto M.**, “Benefits and Pitfalls of GRACE Terrestrial Water Storage Data Assimilation”. Manhattan College, March 21th 2018. *(Invited)*
- **Giroto M.**, R Reichle, G De Lannoy, M Rodell. “Joint assimilation of SMOS brightness temperature and GRACE terrestrial water storage observations for improved soil moisture estimation”. AGU Fall Meeting 2017, New Orleans, Louisiana
- **Giroto M.**, S. A. Margulis, G. Cortés, M. Durand. “A Method for Snow Reanalysis: The Sierra Nevada (USA) Example”. 5th International Conference on Reanalysis, Nov. 11-16th 2017, Rome, Italy
- **Giroto M.**, “Benefits and Pitfalls of GRACE Terrestrial Water Storage Data Assimilation”, GMAO Seminar Series on Earth System Science (GESS). GSFC, October 10th 2017. *(Invited)*
- **Giroto M.**, R Reichle, G De Lannoy, M Rodell, J Kolassa. “Joint assimilation of SMOS brightness temperature and GRACE terrestrial water storage observations for improved soil moisture estimation”, European Geophysical Union, Spring Annual Meeting, Vienna, Austria, April 2017
- **Giroto, M.**, R. H. Reichle, G. De Lannoy, M. Rodell, S. N. Bhanja, and A. Mukherjee (2016), “Changes in India’s land surface water balance during the GRACE mission years: A data assimilation perspective”, AGU Fall Meeting, San Francisco, 12-16 December 2016
- **Giroto M.**, “A Landsat-era Sierra Nevada (CA) Snow Reanalysis: Prospects of Recovery from the Recent Drought”. Science and Exploration Directorate Seminar, July 5th 2016. *(Invited)*
- **Giroto M.**, S. A. Margulis, G. Cortés, L. S. Huning, D. Li, M. Durand. “A Landsat-era (1985-2015) Sierra Nevada (USA) Snow Reanalysis Dataset”. 73rd Eastern Snow Conference, Columbus, Ohio, USA 14 - 16 June, 2016. *Invited*
- **Giroto M.**, G. J. M. De Lannoy, R. H. Reichle, M. Rodell. “Toward the joint assimilation of SMOS brightness temperature and GRACE terrestrial water storage observations for improved soil moisture estimation”. Computational Methods in Water Resources (CMWR). University of Toronto, Canada, 20–24 June 2016.
- **Giroto M.**, G. J. M., R. H. Reichle, M. Rodell. “Assimilation of Gridded GRACE Terrestrial Water Storage Observation for Improving Soil Moisture and Shallow Groundwater Estimates”. AMS Annual meeting, New Orleans 10-14 January 2016
- **Giroto, M.**, G. J. M. De Lannoy, R. H. Reichle, R., M. Rodell. “An Improved GRACE Terrestrial Water Storage Assimilation System For Estimating Large-Scale Soil Moisture and Shallow Groundwater”. AGU Fall Meeting, San Francisco, 12-16 December 2015
- **Giroto M.**, G. J. M. De Lannoy, R. H. Reichle, M. Rodell. “Assimilation of satellite observed brightness temperature and terrestrial water storage into the Catchment land surface model for improved soil moisture estimation”. AGU Fall Meeting, San Francisco, 15-19 December 2014
- **Giroto M.**, G. Cortés, S. A. Margulis, M. Durand. “How much water is in the Sierra Nevada snowpack and how is it changing? A 27-year high-resolution space-time continuous reanalysis dataset”. AGU Fall Meeting, San Francisco, 15-19 December 2014. *Invited*

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- **Giroto, M.**, S. A. Margulis, G. Cortés, M. Durand. "Climate variability and snow water equivalent relations of an alpine watershed in the Sierra Nevada, CA". AGU Fall Meeting, San Francisco 3-7 December 2012
- **Giroto, M.**, S. A. Margulis, M. Durand. "Estimation of snow water equivalent from the assimilation of remotely sensed snow covered area observation" European Space Agency, Earth Observation Summer School, Frascati, Italy, August 2012
- **Giroto, M.**, S. A. Margulis, M. Durand. "Exploration of long-term reanalysis of Sierra Nevada snowpack inferred from snow covered area information" European Geophysical Union, Spring Annual Meeting, Vienna, Austria, April 2012
- **Giroto, M.**, S. A. Margulis, K. Arthofer, M. Durand. "Spatial and temporal analysis of snow water equivalent estimates obtained from a multi-sensor and multi-resolution reconstruction approach". AGU Fall Meeting, San Francisco, 5-9 December 2011
- **Giroto, M.**, S. A. Margulis, M. Durand, N. P. Molotch. "Validation of a Bayesian reconstruction approach to estimate snow water equivalent via assimilation of MODIS fractional SCA data". AGU Fall Meeting, San Francisco, 13-17 December 2010
- **Giroto, M.**, S. A. Margulis, M. Durand, N. P. Molotch. "Application of a Bayesian snow water equivalent reconstruction technique to a mountainous basin in the Sierra Nevada". AGU Fall Meeting, 14-18 December 2009

Manuela Giroto, Oct. 30th 2019

