

EMILIO MAYORGA
CURRICULUM VITAE

CONTACT INFORMATION

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EDUCATION

- 2004 Ph.D., University of Washington, Chemical Oceanography: “Isotopic constraints on sources and cycling of riverine dissolved inorganic carbon in the Amazon basin”
1997 M.S., University of Washington, Chemical Oceanography
1992 B.S., Massachusetts Institute of Technology (MIT), Civil Engineering Department

PROFESSIONAL EXPERIENCE AND SKILLS

- 2009- present Research Scientist and Data Manager, Applied Physics Laboratory, University of Washington, Seattle, WA
2007- 2008 Research Associate, Institute of Marine & Coastal Sciences, Rutgers University, New Brunswick, NJ
2001- 2006 Principal Geographical Information Systems (GIS) Analyst, Surface Water Management Division, Snohomish County Public Works, Everett, WA
1993 - 2001 Research Assistant, School of Oceanography, University of Washington, Seattle, WA

Extensive experience managing diverse environmental data, ranging from local municipal operations to global-scale collaborations. Expertise in data systems and interoperability in multiple geoscience domains, including Oceanography, Hydrology, and the Critical Zone, using the following specific skills, among others:

- Programming experience: Python, SQL, and previously in C, Perl, VBA, Matlab script, and Arc Macro Language. Extensive use of Jupyter notebooks
- Data management: NetCDF, THREDDS, ERDDAP, Relational Database Management Systems (PostgreSQL, MySQL, SQLite, MS Access), XML, heterogeneous format environments, Geospatial data (using open source tools including GDAL/OGR, GeoPackage, GeoServer and GeoPortal, QGIS, plus previous extensive experience in ESRI software stack and regular interactions with ArcGIS stack users)
- Web service standards: OPeNDAP, OGC web services and formats (SOS, SWE, WMS, WFS, CSW, SensorML, WKT), SOAP, REST

NANOOS DMAC LEAD ROLE

NANOOS DMAC (Data Management And Communications) Committee Chair. Leads the NANOOS data management (DAC) team, ensuring that all data collected by the program are timely, properly preserved, and made available via IOOS standard services. Coordinates and leads the implementation of IOOS DMAC functional capabilities involving data integration, management, quality control, distribution and archiving. Coordinates DAC activities among NANOOS DAC partners and serves as primary point of contact between NANOOS, the DAC team, data providers, peer RA DMAC teams, and the IOOS Program Office DMAC team. Also provides coordination with other relevant Cyberinfrastructure and data initiatives regionally, nationally and internationally.

SELECTED PUBLICATIONS AND PRESENTATIONS**Peer-Reviewed Publications**

- Hsu, L., **E. Mayorga**, J.S. Horsburgh, M.R. Carter, K.A. Lehnert and S.L. Brantley. 2017. Enhancing interoperability and capabilities of Earth Science data using the Observations Data Model 2 (ODM2). *Data Science Journal* 16(4):1-16, doi:10.5334/dsj-2017-004
- Horsburgh, J.S., A.K. Aufdenkampe, **E. Mayorga**, K.A. Lehnert, L. Hsu, L. Song, A.S. Jones, S.G. Damiano, D.G. Tarboton, D. Valentine, I. Zaslavsky and T. Whitenack. 2016. Observations Data Model 2: A community information model for spatially discrete Earth observations. *Environmental Modelling & Software* 79:55-74, doi:10.1016/j.envsoft.2016.01.010
- Lee, R.Y., S. Seitzinger and **E. Mayorga**. 2016. Land-based nutrient loading to LMEs: A global watershed perspective on magnitudes and sources. *Environmental Development* 17(Supp. 1):220-229, doi:10.1016/j.envdev.2015.09.006
- Garcia, H.E., C. Cosca, A. Kozyr, **E. Mayorga**, C. Chandler, R.W. Thomas, K. O'Brien, W. Appeltans, S. Hankin, J.A. Newton, A. Gutierrez, J.-P. Gattuso, L. Hansson, M. Zweng, and B. Pfeil. 2015. Data management strategy to improve global use of ocean acidification data and information. *Oceanography* 28(2):226–228, doi:10.5670/oceanog.2015.45
- Valentini, R., A. Arneeth, A. Bombelli, S. Castaldi, R. Cazzolla Gatti, F. Chevallier, P. Ciais, E. Grieco, J. Hartmann, M. Henry, R. A. Houghton, M. Jung, W. L. Kutsch, Y. Malhi, **E. Mayorga**, et al. 2014. A full greenhouse gases budget of Africa: synthesis, uncertainties and vulnerabilities. *Biogeosciences* 11: 381-407, doi:10.5194/bg-11-381-2014
- Raymond, P. A., Hartmann, J., Lauerwald, R., Sobek, S., McDonald, C., Hoover, M., Butman, D., Striegl, R., **Mayorga**, E., Humborg, C., Kortelainen, P., Dürr, H., Meybeck, M., Ciais, P. and Guth, P. 2013. Global carbon dioxide emissions from inland waters. *Nature* 503(7476): 355-359, doi:10.1038/nature12760
- Aufdenkampe, A.K., **E. Mayorga**, P.A. Raymond, J. Melack, S.C. Doney, S.R. Alin, R.E. Aalto and K. Yoo. 2011. Riverine coupling of biogeochemical cycles between land, oceans and atmosphere. *Frontiers in Ecology & Environment* 9(1): 53-60, doi:10.1890/100014
- Fekete, B.M., D. Wisser, C. Kroeze, **E. Mayorga**, L. Bouwman, W.M. Wollheim and C. Vörösmarty. 2010. Millennium Ecosystem Assessment scenario drivers (1970-2050): Climate and hydrological alterations. *Global Biogeochemical Cycles* 24: GB0A12, doi:10.1029/2009GB003593
- Harrison, J., A.F. Bouwman, **E. Mayorga** and S. Seitzinger. 2010. Magnitudes and sources of dissolved inorganic phosphorus inputs to surface fresh waters and the coastal zone: A new global model. *Global Biogeochemical Cycles* 24: GB1003, doi:10.1029/2009GB003590
- Mayorga**, E., S.P. Seitzinger, J.A. Harrison, E. Dumont, A.H.W. Beusen, A.F. Bouwman, B. Fekete, C. Kroeze and G. Van Dreht. 2010. Global Nutrient Export from WaterSheds 2 (NEWS 2): Model development and implementation. *Environmental Modeling & Software* 25: 837-853, doi:10.1016/j.envsoft.2010.01.007
- Seitzinger, S., **E. Mayorga**, A.F. Bouwman, C. Kroeze, A.H.W. Beusen, G. Billen, G. Van Dreht, E. Dumont, B.M. Fekete, J. Garnier and J.A. Harrison. 2010. Global nutrient river export: A scenario analysis of past and future trends. *Global Biogeochemical Cycles* 24: GB0A08, doi:10.1029/2009GB003587
- Vörösmarty, C.J., D. Conley, P. Döll, J. Harrison, P. Letitre, **E. Mayorga**, J. Milliman, S. Seitzinger, J. van der Gun and W. Wollheim. 2009. Chapter 10: The Earth's natural water cycles, pp 166-180. In: World Water Assessment Programme. *The United Nations World Water Development Report 3: Water in a Changing World (WWDR-3)*. Paris: UNESCO, and London: Earthscan. <http://www.unesco.org/water/wwap/wwdr/wwdr3/>
- Aufdenkampe, A.K., **E. Mayorga**, J.I. Hedges, C.A. Llerena, P.D. Quay, J. Gudeman, A.V. Krusche

- and J.E. Richey. 2007. Organic matter in the Peruvian headwaters of the Amazon: Compositional evolution from the Andes to the lowland Amazon mainstem. *Organic Geochemistry* 38: 337-364
- Mayorga, E.**, A.K. Aufdenkampe, C.A. Masiello, A.V. Krusche, J.I. Hedges, P.D. Quay, J.E. Richey and T.A. Brown. 2005. Young organic matter as a source of carbon dioxide outgassing from Amazonian rivers. *Nature* 436: 538-541, doi:10.1038/nature03880
- Mayorga, E.**, M.G. Logsdon, M.V.R. Ballester and J.E. Richey. 2005. Extracting cell-to-cell land surface drainage paths from digital channel networks, with an application to the Amazon basin. *Journal of Hydrology* 315: 167-182
- Grimm, N.B., S.E. Gergel, W.H. McDowell, E.W. Boyer, C.L. Dent, P.M. Groffman, S.C. Hart, J.W. Harvey, C.A. Johnston, **E. Mayorga**, M.E. McClain and G. Pinay. 2003. Merging aquatic and terrestrial perspectives of nutrient biogeochemistry. *Oecologia* 442: 485-501
- McClain, M.E., E.W. Boyer, C.L. Dent, S.E. Gergel, N.B. Grimm, P.M. Groffman, S.C. Hart, J.W. Harvey, C.A. Johnston, **E. Mayorga**, W.H. McDowell and G. Pinay. 2003. Biogeochemical hot spots and hot moments at the interface of terrestrial and aquatic ecosystems. *Ecosystems* 6: 301-312

Other Publications

- Mayorga, E.** 2012. Feature Article: IOOS, NANOOS and SECOORA DMAC Project Advancing IOOS International Partnerships. *IOOS Association National and Regional Coastal and Ocean Observing News, December 2012*.
- Haines, S., V. Subramanian, **E. Mayorga**, D. Snowden, R. Ragsdale, C. Rueda and M. Howard. 2012. IOOS vocabulary and ontology strategy for observed properties. *Proc. MTS/IEEE Oceans'12*, doi:10.1109/OCEANS.2012.6405083
- Newton, J., D. Martin, **E. Mayorga**, A. Devol, R. Feely, S. Alin, B. Dewey, B. Eudeline, A. Barton, A. Suhrbier, A. Baptista and J. Needoba. 2012. NANOOS partnerships for assessing ocean acidification in the Pacific Northwest. *Proc. MTS/IEEE Oceans'12*, doi:10.1109/OCEANS.2012.6405086
- Patterson, J., J. Thomas, L. Rosenfeld, J. Newton, L. Hazard, J. Scianna, R. Kudela, **E. Mayorga**, C. Cohen, M. Cook, M. Otero and J. Adelaars. 2012. Addressing ocean and coastal issues at the West Coast scale through regional ocean observing system collaboration. *Proc. MTS/IEEE Oceans'12*, doi:10.1109/OCEANS.2012.6404937
- Mayorga, E.**, T. Tanner, R. Blair, A.V. Jaramillo, N. Lederer, C.M. Risien and C. Seaton. 2010. The NANOOS Visualization System (NVS): Lessons learned in data aggregation, management and reuse, for a user application. *Proc. MTS/IEEE Oceans'10*, doi:10.1109/OCEANS.2010.5663792
- Risien, C.M., J.C. Allan, R. Blair, A.V. Jaramillo, D. Jones, P.M. Kosro, D. Martin, **E. Mayorga**, J.A. Newton, T. Tanner and S.A. Uczekaj. 2009. The NANOOS Visualization System: Aggregating, displaying and serving data. *Proc. MTS/IEEE Oceans'09*, http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5422325
- Mayorga, E.** 2008. Carbon cycle – Harvest of the century. *Nature* 451: 405-406

Relevant Presentations and Posters (*Invited)

- 2017 **Mayorga, E.**, L. Setiawan, K. Arogyaswamy, M. Leon, E. Aronson, A. Packman & F. Meyer. Cross-site soil and microbial ecology cyberinfrastructure for the CZIMEA project. *EarthCube All-Hands Meeting*, Seattle, WA, 8 Jun.
- 2016 ***Mayorga, E.** GOA-ON Data Portal: Goals, status and plans. *3rd GOA-ON Science Workshop*, Hobart, Australia, 9-11 May.
- 2016 **Mayorga, E.**, J. Newton & T. Tanner. Ocean Acidification monitoring data collaborations, integration and dissemination: The US Pacific NW regional IOOS experience with local to

- global efforts. *2017 Ocean Sciences Meeting*, New Orleans, LA, 23 Feb.
- 2015 ***Mayorga, E.** US IOOS Regional Data Management: The NANOOS NW Perspective. *MEOPAR Oceans Data Management Expert Forum*, Montreal, 18 Nov.
- 2013 ***Mayorga, E.** Desiring, getting, sharing and using your water quality data: Musings on audience, archetypes, communities and approaches. *CUAHSI Conference on Hydroinformatics and Modeling*, Logan, UT, 17–19 Jul
- 2012 **Mayorga, E.,** J. Newton and C. Angell. NANOOS - Shellfish Growers Partnerships: Real-Time Data Access to Increase Understanding of Ocean Acidification. *Annual Pacific Coast Shellfish Growers Association Meeting*, Tulalip Reservation, WA, 24-28 Sep
- 2012 ***Mayorga, E.** Ocean Acidification Network Data Issues, Challenges, Opportunities. *California Current Acidification Network Workshop*, La Jolla, CA, 27–28 Aug
- 2011 ***Mayorga, E.,** H. Kerkering and C. Cohen. IOOS West Coast Regional Experience and Capabilities. *West Coast Regional Data Framework Workshop*. 13-14 Dec
- 2011 ***Mayorga, E.** Complex Marine Data Visualization via GIS Web Services. *University of Washington GIS Day Ignite Talk*, Seattle, WA, 16 Nov
- 2011 ***Mayorga, E.** Regional network example: Northwest Association of Networked Ocean Observing Systems (NANOOS)/OOS Case Study. *Oregon Coastal & Marine Data Workshop*, Salem, OR, 6-7 Jun
- 2011 **Mayorga, E.** and T. Tanner. 2011. The NANOOS Visualization System (NVS): Data aggregation, management and reuse for a coastal-monitoring user application in the Pacific NW. *CUAHSI Conference on Hydrologic Data and Information Systems*, Logan, UT, 22-24 Jun
- 2011 *Newton, J., **E. Mayorga**, J. Allan, S. Rumrill, A. Lanier, C. Bernthal, G. Galasso, E. Bowlby and J. Hennessey. IOOS' role in contributing to national and regional capability for Coastal Marine Spatial Planning: A view from the NANOOS Regional Association. *ASLO Aquatic Sciences Meeting*, San Juan, Puerto Rico, 13-18 Feb.
- 2010 ***Mayorga E.** and D. Jones. Using IOOS to increase efficiencies in offshore fisheries: The NANOOS Pacific NW experience. *First Energy Use in Fisheries Symposium: Improving Efficiency and Technological Innovations from a Global Perspective*, Seattle, WA, 14-17 Nov
- 2010 ***Mayorga, E.** Global NEWS model and scenarios, with results on carbon river fluxes and transformations, focusing on the tropics. *Experimental, typological and modelling approaches to evaluate at global and regional scales horizontal and vertical fluxes from land to the open ocean through rivers, estuaries and the coastal ocean*, Liege, Belgium, 4-5 Oct
- 2010 **Mayorga, E.,** D. Jones and R. Blair. Regional to local IOOS data management and interoperability: Perspective from the trenches (NANOOS, US Pacific NW). *2010 Ocean Sciences Meeting*, Portland, OR, 22-26 Feb.
- 2010 ***Mayorga, E.** Global river nutrient export: Overview, and scenario analysis of past and future trends. *Departmental Seminar, Department of Earth System Science, University of California*, Irvine, CA, 27 Jan.
- 2006 **Mayorga, E.** Snohomish County surface water fee assessment: A system for routine data entry, query, and analysis integrating GIS and a relational database. *Wash. URISA GIS Conference*, Tacoma, WA, 9-11 May.
- 2005 **Mayorga, E.** and Britsch, S. Automation and integration of drainage outfall monitoring data for assessing NPDES water quality compliance. *Wash. URISA GIS Conference*, Seattle, 9-11 May.