

**Marta Angulo-Martínez, PhD**

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### **Research interest:**

Interactions between climate, atmospheric dynamics and soil erosion. Special focus on Rainfall Erosivity or the ability of rainfall to erode soil. Other research interest involve spatio-temporal distribution of climatic variables.

### **Education:**

2012 **Ph.D.** in Geography: Land use, Environment and Society program, with honors. *University of Zaragoza*, (Spain). Area of Specialization: Climatology and Physical Geography

Dissertation: *Climatic factor in soil erosion: Rainfall Erosivity in Ebro basin*

2007 **M.S.** in Geography: Land use, Environment and Society program. *Autonomous University of Madrid*, (Spain). Area of Specialization: Climatology and Physical Geography

Dissertation: *Climatic Droughts in Extremadura*

2005 **B.A.** in Geography; Physical Geography and GIS itinerary. *Autonomous University of Madrid*, (Spain)

### **Working Experience:**

2013-2014 **Postdoctoral Research:** Duke University, Civil and Environmental Engineer Department, (North Carolina, USA). Research adviser: Dr. Ana P. Barros,

- *Postdoctoral researcher for Dr. Barros NASA project: NASA #NNX13AJ54G GPM-GV INTERGRATED PRECIPITATION AND HYDROLOGY EXPERIMENT IPHEX2014. Tasks include management and installation of 26 precipitation microphysics sensors in the Smoky Mountains (Southern Appalachians). Data analysis: spatio-temporal data analysis and uncertainty assessment for several concepts and applications. Interactions between rainfall dynamics and soil erosion. Spatial modeling of precipitation events in comparison with satellite and radar data. Evaluation of the atmospheric mechanisms in relation with the environment, hydrology and water resources in mountainous areas.*

2012 **Postdoctoral Research:** Technical University of Liberec, ascribe it to KLIMATEXT project CZ.1.07/2.3.00/20.0086 co-financed by the European Social Fund and the state budget of the Czech Republic. Research advisers: Dr. Jan Kyselý and Dr. Jan Píček,

- *Evaluation of climate change scenarios for precipitation extremes in relation with projected changes in atmospheric circulation indices, and their implications in rainfall erosivity.*

2008-2012 **PhD Research:** Experimental Station Aula Dei – Spanish National Research Council (EEAD-CSIC) Soil and Water Dpt. Research adviser: Dr. Santiago Beguería,

- *Analysis of climate factors influencing soil erosion: rainfall erosivity, rainfall energy and the climate processes leading soil erosion over large regions with contrasted climatic characteristics, with special focus on extreme events.*
- *Rainfall erosivity time series and spatial analysis based in robust statistical methods as: extreme value theory, geostatistics and spatial interpolation, generalized least square models, linear mixed-effects models and non-linear models, (data management by R statistical software and ArcInfo).*
- *Field study: Laser Precipitation Monitor installation and laboratory analysis of soil types*
- *Research results presentation through non-official seminars*

2010 **Doctoral Research:** CSIRO Land and Water, Australian Commonwealth Scientific and Industrial Research Organization, (Canberra). Research adviser: Dr. Albert van Dijk, Jun. 2010-Oct. 2010

- *Improving rainfall estimation through blending of satellite, radar and pluviograph rainfall data for the Australian territory at hourly scale. Skills covered: bibliographical survey, data management, spatio-temporal analysis and validation by R statistical software.*
- *Research introduction and results presentation through non-official seminars*

2006-2007 **GIS consultant and technician:** Spanish Geological Survey (IGME), advisers: Dr. Javier Navas and Santiago Martín Alfageme,

- *GIS management and Geoscientific cartography through broad use of GIS software, including arcInfo, Mapview and FME*
- *Design and validation (including topology) of GIS procedure to adapt geologic and geomorphologic cartography at 1:50.000 (serie MAGNA) into GIS database. Including meetings with the geologists responsible of reviewing and up to date the Spanish Geological Cartography.*
- *Creation and development of up-to-day geoscientific cartography GIS-based as climatological maps and block diagrams, with special attention to design (as appropriate colour scheme).*

2003-2005 **Research assistant:** Geography Dpt., Autonomous University of Madrid, adviser: Dr. Fernando Molini, Jul. 2003-Dec. 2005

- *Database development for scientific survey. Website design*

### **Awards and memberships:**

*EGU 2013 General Assembly Co-Convener in the following sessions:*

- *SSS 9.11: Soil erosion and desertification processes in Mediterranean areas.*
- *SSS 10.3: Organic farming and Sustainable productivity of soils: a question of balance*

EGU 2013 Young Scientist's Travel Award for Europeans to Reliability of rainfall erosivity indices in comparison with measured by optical disdrometer from natural rainfall events.

CSIC - Spanish National Research Council. Ph.D. Fellowship JaePredoc, Jan.2008 – May.2012

CSIC - Spanish National Research Council. Ph.D. Interchange Research Fellowship Jun.2010 – Oct.2010

IGME - Spanish National Geological Survey Research Fellowship Jan.2006 – Dec.2007

ERASMUS student fellowship award, University of Manchester (UK), Geography Dpt. Sep.2002 – Jun.2003

## Publications and Presentations:

### PEER REVIEWED PUBLICATIONS

1. **Angulo-Martínez, M.**, Barros, A.P. 2014. Measurement uncertainty in KE-I relationships for soil erosion studies: an evaluation using PARSIVEL disdrometers in a mountainous region. *Geomorphology (Submitted)*
2. **Angulo-Martínez, M.**, Beguería, S., Kysely, J. 2013. Reliability of rainfall erosivity indices in comparison with measured by optical disdrometer from natural rain events, *Soil Science Society of America Journal (under review)*
3. **Angulo-Martínez, M.**, Beguería, S. 2013. El factor climático en la erosión de suelo, *Cuatrenario y Geomorfología*, 27(1-2), 53-69.
4. Beguería, S., Spanu, V., Navas, A., Machín, J., **Angulo-Martínez, M.**, 2013. Modelling the spatial distribution of soil. *Journal of Soil and Water Conservation*, 68(3), 172-184.
5. **Angulo-Martínez, M.**, Beguería, S. 2012. Trends in rainfall erosivity in NE Spain at annual, seasonal and daily scales, 1955-2006, *Hydrology Earth and Systems Science*, 16, 3551-3559.
6. **Angulo-Martínez, M.**, Beguería, S., Navas, A., Machín, J. 2012. Splash detachment of soil particles under natural rainfall on three soil types of NE Spain, *Geomorphology*, 175-176: 38-44. Doi: 10.1016/j.geomorph.2012.06.016
7. **Angulo-Martínez, M.**, Beguería, S. 2012. Do atmospheric teleconnection patterns influence rainfall erosivity? A comparison between NAO, MO and WeMO in NE Spain, 1955-2006, *Journal of Hydrology*, 450-451: 168-179. doi:10.1016/j.jhydrol.2012.04.063.
8. Vicente-Serrano, S.M., López-Moreno, J.I., Lorenzo-Lacruz, J., El Kenawy, A., Azorin-Molina, C., Morán-Tejeda, E., Pasho, E., Zabalza, J., Beguería, S., **Angulo-Martínez, M.**, 2011. The NAO Impact on Droughts in the Mediterranean Region, pag 23-40; in Vicente-Serrano, S. M. and Trigo, R. M. (eds.) *Hydrological, Socioeconomic and Ecological Impacts of the North Atlantic Oscillation in the Mediterranean Region*. Springer Dordrecht Heidelberg London New York. ISBN 978-94-007-1371-0. Doi 10.1007/978-94-007-1372-7
9. **Angulo-Martínez, M.**, Beguería, S. 2011. Evaluation of the Relationship Between the NAO and Rainfall Erosivity in NE Spain During the Period 1955-2006, pag 183-198; in Vicente-Serrano, S. M. and Trigo, R. M. (eds.) *Hydrological, Socioeconomic and Ecological Impacts of the North Atlantic Oscillation in the Mediterranean Region*. Springer Dordrecht Heidelberg London New York. ISBN 978-94-007-1371-0. Doi 10.1007/978-94-007-1372-7
10. Beguería, S. Vicente-Serrano, S.M., **Angulo-Martínez, M.**, 2010. A multi-scalar global drought data set: the SPEIbase. *Bulletin of the American Meteorological Society (BAMS)*, 91:10:1351-1356. Doi:10.1175/2010BAMS2988.1.
11. Cabezas, A., **Angulo-Martínez, M.**, Gonzalez-Sanchís, M., Jimenez, J.J., Comín, F.A. 2010. Spatial variability in floodplain sedimentation: the use of generalized linear mixed-effects models. *Hydrology and Earth Systems Science*, 4, 1655-1668. doi: 10.5194/hess-14-1655-2010
12. Vicente-Serrano, S.M., Beguería, S., López-Moreno, J.I., Kenawy, A., **Angulo-Martínez, M.** 2010. A new global 0.5° gridded dataset (1901-2006) of a multiscale drought index: comparison

- with current drought index datasets based on the Palmer Drought Severity Index. *Journal of Hydrometeorology*, 11(4): 1033-1043; doi: 10.1175/2010JHM1224.1.
13. Beguería, S., **Angulo-Martínez, M.**, Vicente-Serrano, S.M., López-Moreno, J.I., Kenawy, A. 2011. Assessing trends in extreme precipitation using nonstationary peaks-over-threshold analysis: a case study in northeast Spain from 1930 to 2006. *International Journal of Climatology*. 31(14) 2102-2114. doi: 10.1002/joc.2218.
  14. **Angulo-Martínez, M.**, Beguería, S. 2009. Estimating rainfall erosivity from daily precipitation records: a comparison among methods using data from the Ebro Basin (NE Spain). *Journal of Hydrology*, 379 (1-2), 111-121; doi: 10.1016/j.jhydrol.2009.09.051.
  15. **Angulo-Martínez, M.**, López-Vicente, M., Vicente-Serrano, S.M., Beguería, S. 2009. Mapping rainfall erosivity at a regional scale: a comparison of interpolation methods in the Ebro Basin (NE Spain). *Hydrology and Earth Systems Science*, 13, 1907-1920.
  16. López-Moreno, J.I., Vicente-Serrano, S.M., **Angulo-Martínez, M.**, Kenawy, A., Beguería, S. 2010. Trends in daily precipitation on the north eastern Iberian Peninsula, 1955-2006. *International Journal of Climatology*, 30, 1026-1041. Doi: 10.1002/joc.1945.
  17. Vicente-Serrano, S.M., Beguería, S., López-Moreno, J.I., Kenawy, A., **Angulo-Martínez, M.** 2009. Daily atmospheric circulation events and extreme precipitation risk in Northeast Spain: the role of the North Atlantic Oscillation, Western Mediterranean Oscillation, and Mediterranean Oscillation. *Journal of Geophysical Research-Atmospheres*, 114, D08106. doi: 10.1029/2008JD011492.

#### INTERNATIONAL CONFERENCES

Kyselý, J., **Angulo-Martínez, M.**, Beguería, S., Beranová, R., Gaál, L., López-Moreno, J.I.: Climate change scenarios of short-term and multi-day precipitation extremes in the Mediterranean and their links to atmospheric circulation. 2013 EGU General Assembly, 08-12 Apr. 2013, Vienna (Austria) *Oral presentation*

**Angulo-Martínez, M.**, Beguería, S., Kyselý, J. Reliability of rainfall erosivity indices in comparison with measured by optical disdrometer from natural rain events. 2013 EGU General Assembly, 08-12 Apr. 2013, Vienna (Austria) *Oral presentation*

**Angulo-Martínez, M.**, Beguería, S., Navas, A., Machín, J. Splash detachment of soil particles under natural rainfall on three soil types of NE Spain. 2013 EGU General Assembly, 08-12 Apr. 2013, Vienna (Austria) *Oral presentation*

**Angulo-Martínez, M.**, Kyselý, J., Beguería, S., Beranová, R., Gaál, L., López-Moreno, J.I., Plavcová E. Links between climate change scenarios of precipitation extremes in the Mediterranean and indices of atmospheric circulation. 12th EMS Annual Meeting; 9<sup>th</sup> European Conference on Applied Climatology (ECAC), 10 Sep.- 14 Sep. 2012, Lodz (Poland) *Poster*

**Angulo-Martínez, M.**, Beguería, S., Kyselý, J. Trends in daily rainfall erosivity in relation with NAO, MO and WeMO during 1955–2006 for the Ebro basin, NE Spain. 12th EMS Annual Meeting; 9<sup>th</sup> European Conference on Applied Climatology (ECAC), 10 Sep.- 14 Sep. 2012, Lodz (Poland) *Poster*

**Angulo-Martínez, M.**, Beguería, S., Trends in daily rainfall erosivity in relation with NAO, MO and WeMO during 1955–2006 for the Ebro basin, NE Spain. International Workshop “Non-stationary extreme value modelling in climatology”, Technical University of Liberec, Faculty of Science, Humanities and Education, 15-17 February 2012, Liberec (Czech Republic) *Oral presentation*

Beguería, S., Vicente-Serrano, S.M., López-Moreno, J.I., **Angulo-Martínez, M.**, El Kenawy, A. The SPEIbase: a new gridded product for the analysis of drought variability and drought impacts. 10th EMS Annual Meeting / 8th European Conference on Applied Climatology (ECAC), European Meteorological Society, 13-17 September 2010, Zurich (Suiza) *Oral presentation*

Beguería, S., Vicente-Serrano, S.M., **Angulo-Martínez, M.**, López-Moreno, J.I., El Kenawy., A. The Standardized Precipitation-Evapotranspiration Index (SPEI): a multiscalar drought index. 10th EMS Annual Meeting / 8th European Conference on Applied Climatology (ECAC), European Meteorological Society, 13-17 September 2010, Zurich (Suiza) *Poster*

**Angulo-Martínez, M.**, Beguería, S. Impacts of the North Atlantic Oscillation (NAO) on soil erosion. *Type of contribution*: ESF-MedCLIVAR Workshop on “Hydrological, socioeconomic and ecological impacts of the North Atlantic Oscillation in the Mediterranean region”, 24-27 May. 2010, Zaragoza (Spain) *Invited talk and book chapter*

**Angulo-Martínez, M.**, Vicente-Serrano, S.M., Beguería, S. Trends in rainfall erosivity (1955-2006) over the Ebro Basin (NE Spain), International Conference On Desertification, 18-20 Sept. 2009, Murcia (Spain). *Poster and article in Proceedings*

**Angulo-Martínez, M.**, López-Vicente, M., Vicente-Serrano, S.M., Beguería, S. Accurate rainfall erosivity estimation from daily precipitation records in the Ebro Basin. European Geosciences Union (EGU); General Assembly, 19-24 Apr. 2009, Vienna (Austria) *Poster*

**Angulo-Martínez, M.**, Beguería, S. Estimation of the RUSLE R factor from daily precipitation records; application to the Ebro basin. PROBACE-Consolider Project meeting; focussed in the hydrological and sediment yield processes at different scales in Mediterranean environments, 11-13 Mar. 2009, Zaragoza (Spain) *Oral presentation*

Vicente-Serrano, S.M., Beguería, S., López-Moreno, J.I., El Kenawy, A., **Angulo-Martínez, M.** Daily atmospheric circulation events and extreme precipitation risk in Northeast Spain: the role of the North Atlantic Oscillation, Western Mediterranean Oscillation, and Mediterranean Oscillation. 8th EMS Annual Meeting; European Conference on Applied Climatology (ECAC), 29 Sep.- 3 Oct. 2008, Amsterdam (The Netherlands) *Poster*

Martín Alfageme, S., Martín-Serrano, A., **Angulo-Martínez, M.** Spanish Geomorphological Mapping Development: from classical map to derived cartography. GIS in Geology & Earth Sciences, Oct. 2007, Querétaro (México) *Oral presentation*.