

Contact Person/Scientist in charge (datos del IP del grupo de investigación o responsable científico)

- o Name and Surname Jaime Javier Crespo Mira
- o Email Jcrespo@umh.es

· Department / Institute / Centre (datos del centro/departamento donde estaría ubicado el investigador a contratar)

- o Name Department of Applied Physics
- o Address Avda. De la Universidad s/n, 03202, Elche
- o Province Alicante

· Brief description of the Centre/Research Group (including URL if applicable)

The Atmospheric Pollution Laboratory of the Miguel Hernández University (LCA-UMH) has developed in recent years projects focused on the physico-chemical characterization of atmospheric particulate matter in southeastern Spain. Our main objective is the characterization of aerosols dynamics in the western Mediterranean basin, whose geographic, orographic and climatic features favor episodic events with high PM concentrations.

Next, some recent publications of the research group are included:

1. Galindo, N., Yubero, E., Nicolás, J.F., Crespo, J., Soler, R. (2016). Chemical characterization of PM₁ at a regional background site in the Western Mediterranean. *Aerosol Air Qual. Res.* 16, 530-541.
2. Nicolás, J.F., Galindo, N., Yubero, E., Crespo, J., Soler, R. (2015). PM₁ variability and transport conditions between an urban coastal area and a high mountain site during the cold season. *Atmospheric Environment* 118, 127-134.
3. J.F. Nicolás, J. Crespo, E. Yubero, R. Soler, A. Carratalá, E. Mantilla (2014). Impacts on particles and ozone by transport processes recorded at an urban and high-altitude monitoring stations. *Science of the Total Environment* 466-467 (439-446).
4. Yubero, E., Galindo, N., Nicolás, J.F., Lucarelli, F., Calzolari, G. (2014). Carbonaceous aerosols at an industrial site in southeastern Spain. *Air Qual. Atmos. Health* 7, 263-271.
5. J. Crespo, E. Yubero, J.F. Nicolás, F. Lucarelli, S. Nava, M. Chiari, G. Calzolari. (2012). High-time resolution and size-segregated elemental composition in high-intensity pyrotechnic exposures. *Journal of Hazardous Materials* 241-242 (82-91).
6. Caballero, S., Esclapez, R., Galindo, N., Mantilla, E., Crespo, J. (2012). Use of a passive sampling network for the determination of urban NO₂ spatiotemporal variations. *Atmos. Environ.* 63, 148-155.
7. Varea, M., Galindo, N., Gil-Moltó, J., Pastor, C., Crespo, J. (2011). Particle-bound polycyclic aromatic hydrocarbons in an urban, industrial and rural area in the western Mediterranean. *J. Environ. Monit.* 13, 2471-2476.
8. Galindo, N., Yubero, E., Nicolás, J.F., Crespo, J., Pastor, C., Carratalá, A., Santacatalina, M. (2011). Water-soluble Ions Measured in Particulate Matter Next to Cement Works. *Atmos. Environ.* 45, 2043-2049.
9. Galindo, N., Varea, M., Gil-Moltó, J., Yubero, E., Nicolás, J. (2011). The Influence of Meteorology on Particulate Matter Concentrations at an Urban Mediterranean Location. *Water Air Soil Pollut.* 215, 365-372.

· Project description

Nowadays, there is great uncertainty about the effect of atmospheric aerosols on the climate due to the high spatio-temporal variability in their concentrations and physico-chemical properties. In order to estimate the radiative forcing of aerosols, data on their

optical properties in different regions of the world is needed. The Mediterranean area represents a geographical region of special interest in this field since aerosol radiative forcing is among the highest in the world there, especially during summer. In spite of this, data on aerosol optical properties in this region are scarce, particularly in the western Mediterranean basin. In order to reduce this deficit, we propose the FARO project, whose main objective is the study of the relationship between the physico-chemical and optical properties of aerosols at two background stations (high mountain and coastal), very close to one another but with a substantial difference in altitude between them. This will allow us to learn the effect of the altitude of a certain location on the optical properties of atmospheric aerosols, under the same geographical and climatic factors, and also the variability of such properties as a function of meteorological conditions. For this, a program of experimental measurements of concentration, chemical composition, size distribution, and optical properties of aerosols (absorption and scattering coefficients), combined with records of meteorological parameters and other tools to interpret the meteorological scenarios, is proposed. The specific objectives of this project are:

- (a) Identify the possible sources of atmospheric particulate matter at both locations from its chemical characterization;
- (b) Estimate the contribution of the chemical components of atmospheric aerosols to the absorption and scattering coefficients, with special attention toward the contribution of mineral dust, so abundant in the study area;
- (c) Consolidate the remote mountain station located at the Aitana peak and extend the continuous recording and determination of parameters that have been conducted there over several years. In addition, promote their use (ACTRIS network);
- (d) Study differences in the optical properties of aerosols in both environments depending on the mixing layer height;
- (e) Gain better insight about the interaction between mineral dust and ozone, two pollutants of particular importance in the Mediterranean region;
- (f) Estimate the radiative forcing induced by aerosols in the western Mediterranean based on optical properties measurements.

· Research Area

Environmental Sciences and Geology (ENV)