



**National SCAR Committee, Spain**

**ANNUAL SCAR REPORT ON SPANISH ANTARCTIC  
SCIENTIFIC ACTIVITIES  
2018-2019 CAMPAIGN  
AND  
PLANNED NEW PROGRAMMES**

**Report no. 31  
for the Scientific Committee on Antarctic Research (SCAR)**

**2019**

**INTERNATIONAL SCIENCE COUNCIL  
SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH**

**ANNUAL SCAR REPORT ON  
NATIONAL ANTARCTIC SCIENTIFIC ACTIVITIES  
1 July 2018 - 30 June 2019**

**Member Country: SPAIN**

**National SCAR Committee:**

|           |                                                                                          |
|-----------|------------------------------------------------------------------------------------------|
| Title     | Comité Nacional de Investigación Antártica - SCAR                                        |
| Address   | Facultad de Ciencias, módulo 06<br>Universidad Autónoma de Madrid<br>28049 Madrid, Spain |
| Telephone | +34 91 497 45 13                                                                         |
| Web       | <a href="http://www.uam.es/cn-scar.es">www.uam.es/cn-scar.es</a>                         |

Chairman/President Dr. J. López-Martínez

**Representatives:**

**to SCAR**

|                    | <b>Name</b>             | <b>Address</b> |
|--------------------|-------------------------|----------------|
| Permanent Delegate | Dr. J. López-Martínez   | (1)            |
| Alternate Delegate | Dr. J. Galindo-Zaldívar | (2)            |

**to SCAR Standing Scientific Groups**

|                   |                         |     |
|-------------------|-------------------------|-----|
| Geosciences       | Dr. J. Galindo-Zaldívar | (2) |
|                   | Dr. J.A. Flores         | (3) |
| Life Sciences     | Dr. L.G. Sancho         | (4) |
|                   | Dr. D. Vaqué            | (5) |
| Physical Sciences | Dr. F.J. Navarro        | (6) |
|                   | Dr. C. Escutia          | (7) |

**National Operating units:**

**Scientific Projects Management:**

Title Área de Investigación Polar  
Ministerio de Ciencia, Innovación y Universidades  
Agencia Estatal de Investigación  
Address Paseo Castellana, 162. 28046 Madrid. Spain

**Data Center:**

Title National Polar Data Center  
Instituto Geológico y Minero de España  
Address Ríos Rosas, 23. 28003 Madrid. Spain  
Web <http://hielo.igme.es>

**Logistics and operations:**

Title Unidad de Tecnología Marina (UTM)  
Centro Mediterráneo de Investigaciones Marinas y  
Ambientales, CSIC  
Address Passeig Marítim de la Barceloneta, 37-49  
08003 Barcelona. Spain  
Web [www.utm.csic.es](http://www.utm.csic.es)

**National Polar Authority:**

Title Comité Polar Español  
Ministerio de Ciencia, Innovación y  
Universidades  
Address Paseo Castellana, 162. 28046 Madrid. Spain  
Web [www.ciencia.gob.es/portal/site/MICINN/CPE](http://www.ciencia.gob.es/portal/site/MICINN/CPE)

Member Country: **SPAIN**

## NATIONAL PROGRAMMES/PROJECTS

### PERMANENT STATIONS (WINTERING)

| Name | Location | Coordinates |
|------|----------|-------------|
| NONE |          |             |

### SUMMER-ONLY BASES

| Name                       | Location          | Coordinates                                                                                                                                                                                      |
|----------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Juan Carlos I</b>       | Livingston Island | 62° 39' 46" S<br>60° 23' 20" W<br>Altitude aprox.: 10 m<br>( <a href="http://www.utm.csic.es/web/index.php/es/instalaciones/jci">http://www.utm.csic.es/web/index.php/es/instalaciones/jci</a> ) |
| <b>Gabriel de Castilla</b> | Deception Island  | 62° 58' 40" S<br>60° 40' 30" W<br>Altitude aprox.: 10 m<br>( <a href="http://www.ejercito.mde.es/mexterior/webantartida/">http://www.ejercito.mde.es/mexterior/webantartida/</a> )               |

### VESSELS OPERATING IN ANTARCTICA

- R/V Hespérides <http://www.utm.csic.es/web/index.php/es/instalaciones/hes>
- R/V Sarmiento de Gamboa, <http://www.utm.csic.es/es/instalaciones/sdg>

### AUTOMATIC RECORDING STATIONS/OBSERVATORIES

| Name/Identifier                | Coordinates                                         | Parameters Recorded                                                                          |
|--------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------|
| 89064                          | 62° 39' 46" S, 60° 23' 20" W<br>(Livingston Island) | Meteorology                                                                                  |
| Gabriel de Castilla<br>Station | 62.98° S, 60.68° W<br>(Deception Island)            | Meteorology                                                                                  |
| Seismic network                | 62° 57' S, 60° 40' W<br>(Deception Island)          | Volcano-seismology, 5 short period<br>three-component station<br>(summer only, 1994-present) |

Member Country: **SPAIN**

NATIONAL PROGRAMMES/PROJECTS

|                              |                                                                    |                                                                                                                                        |
|------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| DCP permanent                | 62° 59' S, 60° 41' W<br>(Deception Island)                         | Seismology, 16-S,<br>three-component station<br>(continuous recording, 2008-present)                                                   |
| Seismic array                | 62° 58' S, 60° 42' W<br>(Deception Island)                         | Volcano-seismology, (short period,<br>12-channel, vertical component,<br>small aperture seismic array).<br>(summer only, 1994-present) |
| LVN permanent<br>seismometer | 62° 40' S, 60° 23' W<br>(Livingston Island)                        | Seismology, 16-s, three-component station<br>(continuous recording, summer only)                                                       |
| CCV permanent<br>Seismometer | 64° 09' S, 60° 58' W<br>(Cierva Cove)                              | Seismology, 16-s, three-component station<br>(continuous recording, 2008-present)                                                      |
| ----                         | Geographic:<br>62° 39' 44" S, 60° 23' 21" W<br>(Livingston Island) | Magnetic elements<br>(D, H, Z, F)                                                                                                      |
| Campbell                     | 62° 66' S, 60° 30' W<br>(Johnson Glacier, Livingston Island)       | Meteorology                                                                                                                            |
| Campbell                     | 62° 65' S, 61° 11' W<br>(Byers Peninsula, Livingston Island)       | Meteorology                                                                                                                            |

\* Maintenance activities for acquisition of instrumental data series are indicated in the last section of this report.

---

Member Country: **SPAIN**

NATIONAL PROGRAMMES/PROJECTS

**GEOSCIENCES**

| Subject        | Investigation                                                                                              | Locality                                                             | Duration  | Principal Investigator            | Address      |
|----------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------|-----------------------------------|--------------|
| Seismology     | * Volcano seismology<br>* Submarine volcanoes<br>* Earthquakes locations                                   | Bransfield Strait                                                    | 2017-2020 | J. Almendros                      | (8)          |
| Volcanology    | * Volcanic hazard<br>* Petrology<br>* Geomorphology                                                        | Deception Island                                                     | 2017-2019 | A. Geyer                          | (9)          |
| Geodesy        | * Geodetic measurements<br>* Volcano deformations                                                          | Deception Island,<br>Livingston Island,<br>South Shetland<br>islands | 2018-2020 | M. Berrocoso                      | (10)         |
| Volcanology    | * Volcanic activity<br>* Petrology and<br>geochemistry<br>* Volcanic gases and<br>magmatic source          | Deception Island                                                     | 2018-2021 | A.M. Álvarez-Valero               | (11)         |
| Marine geology | * Plate tectonics<br>* Continental margins<br>* Geophysical and<br>structural data<br>* Cenozoic evolution | Drake Passage and<br>Tasman Sea                                      | 2018-2021 | F. Bohoyo<br>A. Maestro           | (12)<br>(13) |
| Marine geology | * Geodynamic evolution<br>* Cenozoic sedimentary<br>record<br>* Palaeoenvironmental<br>changes             | Drake Passage and<br>Tasman Sea                                      | 2018-2021 | C. Escutia<br>F.J. Jiménez-Espejo | (7)<br>(14)  |

Member Country: **SPAIN**

## NATIONAL PROGRAMMES/PROJECTS

|                           |                                           |                                                      |           |                                |      |
|---------------------------|-------------------------------------------|------------------------------------------------------|-----------|--------------------------------|------|
| Geology and Geomorphology | * Geomorphology and soils                 | South Shetland Islands, Northern Antarctic Peninsula | 2019-2021 | J. López-Martínez<br>T. Schmid | (1)  |
|                           | * Remote sensing                          |                                                      |           |                                | (15) |
|                           | * Geological heritage and geoconservation |                                                      |           |                                |      |
|                           | * Hydrology and weathering                |                                                      |           |                                |      |

## LIFE SCIENCES

| Subject                           | Investigation                                                     | Locality                                                              | Duration  | Principal Investigator  | Address |
|-----------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|-----------|-------------------------|---------|
| Vegetal Biology                   | * Cryptogamic cover biocomplexity and functioning                 | Antarctic Peninsula region                                            | 2016-2019 | L.G. Sancho             | (5)     |
|                                   | * Microbial biodiversity                                          |                                                                       |           |                         |         |
| Vegetal Biology                   | * Biodiversity                                                    | Antarctic Peninsula region                                            | 2016-2019 | A. de los Ríos          | (16)    |
|                                   | * Cryptogamic cover organization, functioning and interdependence |                                                                       |           |                         |         |
| Bioactive marine natural products | * Chemical ecology                                                | Deception and Livingston islands coastal areas                        | 2017-2019 | C. Ávila                | (17)    |
|                                   | * Marine invertebrates, algae, microbiology                       |                                                                       |           |                         |         |
|                                   | * Benthic ecosystems                                              |                                                                       |           |                         |         |
| Microbiology                      | * Aerobiology                                                     | Byers Peninsula, Livingston Island.                                   | 2017-2019 | A. Quesada<br>A. Justel | (18)    |
|                                   | * Microbial communities                                           | Antarctic Peninsula region. Antarctica                                |           |                         | (19)    |
|                                   | * Biogeography                                                    |                                                                       |           |                         |         |
| Biogeography and ecophysiology    | * Impacts in ecosystems                                           | Northern Antarctic Peninsula region, Deception and Livingston islands | 2018-2020 | M.A. Olalla             | (20)    |
|                                   | * Invasive species                                                |                                                                       |           |                         |         |
|                                   | * Microarthropods                                                 |                                                                       |           |                         |         |

Member Country: **SPAIN**

## NATIONAL PROGRAMMES/PROJECTS

|                          |                                                          |                                                                                        |           |                          |      |
|--------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------|-----------|--------------------------|------|
| Vegetal<br>ecophysiology | * Cryptogamic cover,<br>biocomplexity and<br>functioning | Livingston Island,<br>King George<br>Island, Northern<br>Antarctic Peninsula<br>region | 2019-2022 | J. Flexas                | (21) |
|                          |                                                          |                                                                                        |           | J. Gulías                | (22) |
|                          |                                                          |                                                                                        |           | J.I. García-<br>Plazaola | (23) |
|                          | * Tolerance mechanisms                                   |                                                                                        |           | J. Martínez-<br>Abaigar  | (24) |
|                          | * Plant colonization                                     |                                                                                        |           | E. Núñez-Olivera         | (25) |
|                          | * Photosynthetic<br>capacity                             |                                                                                        |           |                          |      |
| Penguin studies          | * Role on<br>biogeochemical cycles                       | Deception Island,<br>Livingston Island<br>and other places                             | 2019-2021 | A. Tovar                 | (26) |
|                          | * Trace metals                                           |                                                                                        |           |                          |      |
|                          | * Biodisponibility and<br>toxicity                       |                                                                                        |           |                          |      |

## PHYSICAL SCIENCES

| Subject                                    | Investigation                     | Locality                                             | Duration  | Principal<br>Investigator  | Address      |
|--------------------------------------------|-----------------------------------|------------------------------------------------------|-----------|----------------------------|--------------|
| Geodetic<br>positioning and<br>Hydrography | * Galileo Project                 | Antarctic<br>Peninsula region                        | 2016-2020 | J.A. Rengel                | (27)         |
|                                            | * Validation<br>measurements      |                                                      |           |                            |              |
|                                            | * Nautical charts                 |                                                      |           |                            |              |
| Cosmic rays                                | * Cosmic ray<br>observatory       | Juan Carlos I<br>Station, Livingston<br>Island       | 2017-2020 | J.J. Blanco<br>J.J. Garzón | (28)<br>(29) |
|                                            | * Solar energetic<br>particles    |                                                      |           |                            |              |
|                                            | * Solar activity                  |                                                      |           |                            |              |
| Aerosols                                   | * Aerosols<br>measurements        | Marambio station,<br>Seymour-<br>Marambio Island     | 2017-2019 | A. de Frutos               | (30)         |
| Atmospheric<br>aerosols                    | * Aereosol<br>characterization    | Juan Carlos I and<br>Gabriel de Castilla<br>stations | 2018-2020 | J. Anzano<br>J. Cáceres    | (31)<br>(32) |
|                                            | * Particulate mineral<br>material |                                                      |           |                            |              |

Member Country: **SPAIN**

## NATIONAL PROGRAMMES/PROJECTS

|                         |                                                                                                                                                                           |                                                                 |           |                              |              |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------|------------------------------|--------------|
| Glacial dynamics        | <ul style="list-style-type: none"> <li>* Mass balance and Calving fluxes</li> <li>* Glacial-ocean thermomechanical interactions</li> <li>* Numerical modelling</li> </ul> | Livingston Island and South Shetland islands                    | 2018-2020 | F.J. Navarro                 | (6)          |
| Atmospheric Chemistry   | <ul style="list-style-type: none"> <li>* Halogens</li> <li>* Ozone</li> <li>* Troposphere and stratosphere</li> </ul>                                                     | Belgrano station, Marambio station and Ushuaia                  | 2018-2020 | M. Yela                      | (33)         |
| Atmospheric composition | <ul style="list-style-type: none"> <li>* Aerosol and clouds</li> <li>* Radiative balance</li> </ul>                                                                       | Juan Carlos I station, Marambio station and Ny Alesund          | 2019-2021 | V. Cachorro<br>R. Román Díez | (34)<br>(35) |
| Chemical contaminants   | <ul style="list-style-type: none"> <li>* Persistent organic contaminants</li> <li>* Transport, accumulation and distribution</li> </ul>                                   | Livingston Island and transect to Bellingshausen Sea            | 2019-2021 | J. Dachs<br>B. Jiménez Luque | (36)<br>(37) |
| Communication           | <ul style="list-style-type: none"> <li>* Remote sensors</li> <li>* Data transmission</li> <li>* HF and NVIS networks</li> </ul>                                           | Juan Carlos I station, Livingston Island and surrounding region | 2019-2021 | J.L. Pijoan                  | (38)         |

Member Country: **SPAIN**

## NATIONAL PROGRAMMES/PROJECTS

### INSTRUMENTAL DATA SERIES MAINTENANCE

*(These activities are supported for maintaining the acquisition of instrumental data. They are not equivalent to the previously mentioned projects and have not been evaluated by the same system)*

| <b>Instrumental data recovered</b>       | <b>Location</b>                                   | <b>Duration</b> | <b>Responsible</b>     |              |
|------------------------------------------|---------------------------------------------------|-----------------|------------------------|--------------|
| Seismic measurements                     | Deception Island                                  | 2019-20         | J. Almendros           | (8)          |
| Geomagnetism and Ionosphere Measurements | Juan Carlos I station                             | 2019-20         | J.M. Torta             | (39)         |
| Geodetic measurements                    | Livingston and Deception islands                  | 2019-20         | M. Berrocoso           | (10)         |
| Meteorological measurements              | Livingston and Deception islands stations         | 2019-20         | S. Buisan<br>J. Riesco | (40)<br>(41) |
| Permafrost measurements                  | Livingston and Deception islands and Cierva Point | 2019-20         | M.A. de Pablo          | (42)         |

**CONTACT ADRESSES, TELEPHONE,  
FACSIMILE AND E-MAIL NUMBERS**

- (1) Jerónimo LÓPEZ-MARTÍNEZ  
Dpto. Geología y Geoquímica  
Facultad de Ciencias  
Universidad Autónoma de Madrid  
Ctra. Colmenar Viejo, km 15  
28049 Madrid  
Tel.: 34 91 497 45 13  
e-mail: jeronimo.lopez@uam.es
- (2) Jesús GALINDO-ZALDIVAR  
Dpto. Geodinámica  
Universidad de Granada  
18071 Granada  
Tel.: 34 958 24 33 49  
e-mail: jgalindo@ugr.es
- (3) José Abel FLORES  
Dpto. Geología  
Facultad de Ciencias  
Universidad de Salamanca  
37008 Salamanca  
Tel.: 34 923 29 44 97  
e-mail: flores@usal.es
- (4) Leopoldo G. SANCHO  
Dpto. Biología Vegetal II  
Facultad de Farmacia  
Universidad Complutense de Madrid  
Ciudad Universitaria, s/n  
28040 Madrid  
Tel.: 34 91 394 17 69 / 394 17 71  
e-mail: sancholg@farm.ucm.es
- (5) Dolors VAQUÉ  
Instituto de Ciencias del Mar  
Centro Mediterráneo de Investigaciones  
Marinas y Ambientales, CSIC  
Passeig Marítim, 39-45  
08003 Barcelona  
Tel.: 34 93 221 64 16  
e-mail: dolors@icm.csic.es
- (6) Francisco NAVARRO  
Dpto. Matemática Aplicada  
ETSI de Telecomunicaciones  
Universidad Politécnica de Madrid  
Ciudad Universitaria, s/n  
28040 Madrid  
Tel.: 34 91 453 35 65  
e-mail: francisco.navarro@upm.es
- (7) Carlota ESCUTIA  
Instituto Andaluz de Ciencias de la Tierra  
CSIC- Universidad de Granada  
Avda. de las Palmeras, 4  
18100 Armilla, Granada  
Tel.: 34 958 24 41 59  
e-mail: cescutia@ugr.es
- (8) Javier ALMENDROS  
Facultad de Ciencias  
Universidad de Granada  
18071 Granada  
Tel.: 34 958 24 95 52  
e-mail: vikingo@ugr.es
- (9) Adelina GEYER  
Instituto de Ciencias de la Tierra Jaume  
Almera, CSIC  
C/ Lluís Solé i Sabarís s/n  
08028 Barcelona  
Tel.: 34 93 409 54 10  
e-mail: ageyer@ictja.csic.es
- (10) Manuel BERROCOSO  
Facultad de Ciencias  
Universidad de Cádiz  
11510 Puerto Real, Cádiz  
Tel.: 34 956 01 64 73  
e-mail: manuel.berrocoso@uca.es
- (11) Antonio Miguel ÁLVAREZ-VALERO  
Dpto. Geología  
Facultad de Ciencias  
Universidad de Salamanca  
37008 Salamanca  
Tel.: 34 665 90 04 50  
e-mail: aav@usal.es
- (12) Fernando BOHOYO  
Instituto Geológico y Minero de España  
La Calera, 1  
Tres Cantos  
28760 Madrid  
Tel.: 34 91 728 72 71  
e-mail: bohoyo@igme.es
- (13) Adolfo MAESTRO  
Instituto Geológico y Minero de España  
La Calera, 1. Tres Cantos  
28760 Madrid  
Tel.: 34 91 728 72 60  
e-mail: a.maestro@igme.es
- (14) Francisco José JIMÉNEZ-ESPEJO  
Instituto Andaluz de Ciencias de la Tierra  
CSIC- Universidad de Granada  
Avda. de las Palmeras, 4  
18100 Armilla, Granada  
Tel.: 34 958 19 02 10  
e-mail: francisco.jimenez@iact.ugr-csic.es
- (15) Thomas SCHMID  
Centro de Investigación Energética  
Medioambiental y Tecnológica (CIEMAT)  
Dpto. Medio Ambiente  
Avda. Complutense, 40  
28040 Madrid

- Tel.: 34 91 346 62 32  
e-mail: thomas.schmid@ciemat.es
- (16) Asunción de los RÍOS  
Instituto de Recursos Naturales  
Consejo Superior de Investigaciones  
Científicas (CSIC)  
Serrano, 115  
28006 Madrid  
Tel.: 34 91 745 25 00  
e-mail: arios@ccma.csic.es
- (17) Conxita ÁVILA  
Edificio Ramón Margalef  
Facultad de Biología  
Universidad de Barcelona  
Avinguda Diagonal 645  
08028 Barcelona  
Tel: 34 93 402 01 61  
e-mail: conxita.avila@ub.edu
- (18) Antonio QUESADA  
Dpto. Biología  
Facultad de Ciencias  
Universidad Autónoma de Madrid  
Ctra. Colmenar Viejo, km 15  
28049 Madrid  
Tel.: 34 91 497 81 81  
e-mail: antonio.quesada@uam.es
- (19) Ana JUSTEL  
Dpto. Matemáticas  
Facultad de Ciencias  
Universidad Autónoma de Madrid  
Ctra. Colmenar Viejo, km 15  
28049 Madrid  
Tel.: 34 91 497 70 67  
e-mail: ana.justel@uam.es
- (20) Miguel Ángel OLALLA  
Escuela Superior de Ciencias  
Experimentales y Tecnología  
Universidad Rey Juan Carlos  
Tulipán, s/n  
28933 Móstoles  
Madrid  
Tel.: 34 91 803 35 85  
email: miguel.olalla@urjc.es
- (21) Jaume FLEXAS  
Instituto de Investigaciones  
Agroambientales y de Economía del Agua  
(INAGEA)  
Universidad de las Islas Baleares  
Ctra. de Valldemossa, km 7.5  
07122 Palma de Mallorca, Islas Baleares  
Tel.: 34 971 17 23 65  
e-mail: jaume.flexas@uib.es
- (22) Javier GULÍAS  
Instituto de Investigaciones  
Agroambientales y de Economía del Agua  
(INAGEA)  
Ctra. de Valldemossa, km 7,5  
07122 Palma de Mallorca, Islas Baleares  
Tel.: 34 971 17 20 69  
e-mail: javier.gulias@uib.es
- (23) José Ignacio GARCÍA-PLAZAOLA  
Dept. Biología Vegetal  
Universidad del País Vasco  
Barrio Sarriena s/n  
48940 Leioa, Vizcaya  
Tel.: 34 946 01 53 19  
e-mail: joseignacio.garcia@ehu.eus
- (24) Javier MARTÍNEZ-ABAIGAR  
Facultad de Ciencia y Tecnología  
Universidad de la Rioja  
Madre de Dios, 53  
26004 Logroño, La Rioja  
Tel.: 34 941 29 97 54  
e-mail: javier.martinez@unirioja.es
- (25) Encarnación NÚÑEZ-OLIVERA  
Facultad de Ciencia y Tecnología  
Universidad de la Rioja  
Madre de Dios, 53  
26004 Logroño, La Rioja  
Tel.: 34 941 29 97 54  
e-mail: encarnacionnunez@unirioja.es
- (26) Antonio TOVAR  
Instituto de Ciencias Marinas de Andalucía  
Campus Río San Pedro  
11519 Puerto Real, Cádiz  
Tel.: 34 956 83 26 12 ext. 283  
e-mail: a.tovar@csic.es
- (27) Juan Antonio RENGEL  
Instituto Hidrográfico de la Marina  
Pl. San Severiano, 3  
11007 Cádiz.  
Tel.: 34 956 59 94 16  
e-mail: renortega@fn.mde.es
- (28) Juan José BLANCO  
Dpto. de Física y Matemáticas  
Facultad de Ciencias  
Universidad de Alcalá de Henares  
Ctra. Madrid-Barcelona, km 33,600  
28805 Alcalá de Henares, Madrid  
Tel: 34 91 885 49 57  
e-mail: juanjo.blanco@uah.es
- (29) Juan Antonio GARZÓN  
LabCAF  
Instituto Gallego de Física de Altas  
Energías  
Universidad de Santiago de Compostela

- C/ Xoaquín Díaz de Rábago, 15705  
Santiago de Compostela, A Coruña  
Tel.: 34 881 81 10 00 ext. 13992  
e-mail: juanantonio.garzon@usc.es
- (30) Ángel de FRUTOS  
Dpto. de Física Teórica, Atómica y Óptica  
Facultad de Ciencias  
Universidad de Valladolid  
Paseo de Belén, 7  
47011 Valladolid  
Tel.: 34 983 42 32 70  
e-mail: angel@geoa.uva.es
- (31) Jesús ANZANO  
Dpto. Química Analítica  
Facultad de Ciencias  
Universidad de Zaragoza  
Pedro Cerbuna, 12  
50001 Zaragoza  
Tel.: 34 976 76 26 84  
e-mail: janzano@unizar.es
- (32) Jorge CÁCERES  
Dpto. Química Analítica  
Facultad de Ciencias Químicas  
Universidad Complutense de Madrid  
28040 Madrid  
Tel.: 34 91 394 43 26  
e-mail: jcaceres@ucm.es
- (33) Margarita YELA  
Instituto Nacional de Técnica Aeroespacial  
Ctra. de Ajalvir, km 4  
28850 Torrejón de Ardoz, Madrid  
Tel.: 34 91 520 12 20  
e-mail: yelam@inta.es
- (34) Victoria CACHORRO  
Dpto. Física Teórica y Física Atómica y Nuclear  
Facultad de Ciencias  
Universidad de Valladolid  
Paseo Belén, 7  
47011 Valladolid  
Tel.: 34 983 42 32 70  
e-mail: chiqui@goa.uva.es
- (35) Roberto ROMÁN DÍEZ  
Dpto. Física Teórica y Física Atómica y Nuclear  
Facultad de Ciencias  
Universidad de Valladolid  
Paseo Belén, 7  
47011 Valladolid  
Tel.: 34 983 42 32 70  
e-mail: robertor@goa.uva.es
- (36) Jordi DACHS  
Instituto de Diagnóstico Ambiental y Estudios del Agua  
Jordi Girona, 18-24  
08034 Barcelona, España  
Tel: 34 93 400 61 00  
e-mail: jdmqam@cid.csic.es
- (37) Begoña JIMÉNEZ LUQUE  
Instituto de Química Orgánica  
Consejo Superior de Investigaciones Científicas (CSIC)  
Juan de la Cierva, 3  
28006 Madrid  
Tel.: 34 91 258 75 50  
e-mail: bjimenez@iqog.csic.es
- (38) Juan Luis PIJOAN  
ETSI Electrónica e Informática La Salle  
Passeig Bonanova, 8  
08022 Barcelona  
Tel.: 34 93 290 24 00  
e-mail: joanp@salleurl.edu
- (39) J. Miquel TORTA  
Observatorio de Física Cósmica del Ebro  
43520 Roquetes  
Tarragona  
Tel.: 34 977 50 05 11  
e-mail: jmtorta@obsebre.es
- (40) Samuel BUISAN  
Agencia Estatal de Meteorología  
Centro Meteorológico Territorial de Aragón, La Rioja y Navarra  
Pº del Canal, 17  
50009 Zaragoza  
Tel.: 34 976 56 97 00  
e-mail: sbuisans@aemet.es
- (41) Jesús RIESCO  
Agencia Estatal de Meteorología  
Centro Meteorológico de Málaga  
Demóstenes, 4.  
29010 Málaga  
Tel.: 34 952 61 19 25  
e-mail: jriescom@aemet.es
- (42) Miguel Ángel de PABLO  
Dpto. Geología  
Universidad de Alcalá de Henares  
Ctra. Madrid-Barcelona, km 33,600  
28871 Alcalá de Henares, Madrid  
Tel: 34 91 885 64 25  
e-mail: miguelangel.depablo@uah.es