

## Personal information

### Aleix Cortina Guerra

Date of birth: 22/10/1977

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## Education

- 2012      **PhD in Geology**, at the University of Salamanca, Spain.
- 2007      **MSc in Marine Ecology**, at the Ensenada Center for Scientific Research and Higher Education, Mexico
- 2002      **BSc in Environmental Sciences**, at the Autonomous University of Barcelona, Spain.

## Employment

- 09-2015 / present      **Research assistant** at the Geosciences Department of the IDAEA-CSIC, Spain. Area: Micropaleontology and Organic geochemistry
- 10-2014 / 09/2015      **Postdoctoral researcher** at the Environmental Geochemistry Department of the Fluminense Federal University, Brazil. Area: Micropaleontology and Organic geochemistry.
- 09-2013 / 08-2014      **Junior Lecturer** at the Earth Science Department of the University of Lausanne, Switzerland. Area: Radiolarian biostratigraphy
- 09-2012 / 08-2013      **Research assistant** at the Paleontology Department of the University of Salamanca, Spain. Area: Micropaleontology and inorganic geochemistry
- 08-2003 / 08-2004      **Laboratory technician** at the Ensenada Center for Scientific Research and Higher Education, Mexico. Area: Paleoclimatology.

## Scholarships

- 10-2014 / 09/2015      **Postdoctoral fellowship** granted by the Science without Borders Program, Brazil. Postdoctoral Grant Level A. It is granted to exceptional accepted candidates (25%). Area: Organic geochemistry

10-2007 / 06-2012 **PreDoctoral fellowship** granted by the Science and Education Ministry, Spain (BES-2007-17602). Area: Paleoclimatology

09-2004 / 02-2007 **MSc scholarship** granted by the National Council of Science and Technology, Mexico. Area: Paleoclimatology.

### Research short stays

03-2011 / 08-2011 Research short stay granted by the Science and Education Ministry

Main goal: Development of analytical techniques for the **study of biomarker compounds in ocean sediments**.

Center: Geosciences Department of the IDAEA-CSIC, Spain

Supervisor: Dr. Joan Grimalt (jgoqam@cid.csic.es).

05-2010 / 09-2010 Research short stay granted by the Science and Education Ministry

Main goal: Development of analytical techniques for the **study of major/trace elements and phosphorous sequential extraction in marine sediments**.

Center: Indiana University Purdue-University Indianapolis, Indianapolis, USA.

Supervisor: Gabriel Filippelli (gfilippe@iupui.edu).

09-2009 / 12-2009 Research short stay granted by the Science and Education Ministry

Main goal: **Identification of benthic and planktic foraminifers**

Center: Geoscience Institute of Padova (ICC), Italy.

Supervisor: Dra. Alessandra Assioli (alessandra.assioli@igg.cnr.it).

### Teaching experience

03-2014 / 06-2014 **Paleontology (60 hours)**. University degree: BSc Geosciences and Environment, University of Lausanne. Language: English.

09-2013 / 02-2014 **Introduction to Earth Sciences (60 hours)**. University degree: BSc Geosciences and Environment, University of Lausanne. Language: English.

- 09-2012 / 02-2013 **Micropaleontology (60 hours)**. University degree: BSc Geology, University of Salamanca, Spain. Language: Spanish.
- 09-2012 / 02-2013 **Paleoceanography and Climate Change (60 hours)**. University degree: BSc Geology, University of Salamanca, Spain. Language: Spanish.
- 09-2005 / 01-2006 **Multivariate Statistics (60 hours)**. University degree: MSc Marine Ecology, Ensenada Center for Scientific Research and Higher Education, Mexico. Language: Spanish.

### Scientific projects

- 2015 / 2017 CONSOLIDER GRACCIE network. Dynamization program of excellence networks. (CTM2014-59111-REDC). IDAEA-CSIC, Spain.  
**Principal Investigator:** Joan O. Grimalt.  
**Role:** Team member. Use of organic biomarkers as paleoclimate proxies.
- 2014 / 2015 Asymmetry in the distribution of the western South Atlantic currents during the last 130 ka and their impact on South America climate (13/2014). Fluminense Federal University, Brazil  
**Principal Investigator:** Ana Luiza Albuquerque.  
**Role:** Team member. Use of organic biomarkers as paleoclimate proxies.
- 2013 / 2014. The Caribbean Seaway - Mesozoic ocean circulation, radiolarite distribution and the marine silica cycle (143894). University of Lausanne, Switzerland  
**Principal Investigator:** Peter Oliver Baumgartner.  
**Role:** Team member. Radiolarian biostratigraphy.
- 2011 / 2013 Multidisciplinary Research Consortium on Gradual and Abrupt Climate Changes and their Impacts on the Environment (GRACCIE) (CSD 2007- 00067). University of Salamanca, Spain  
**Principal investigator:** Joan O. Grimalt.  
**Role:** Team member. Use of inorganic geochemistry and micropaleontology (benthic and planktic foraminifer assemblages) as paleoclimate proxies.
- 2009 / 2011 Climatic events at millennial and sub millennial frequency recorded over the last 70.000 years in the southeast and equatorial Pacific (ODP 202) (CGL2009-08651). University of Salamanca, Spain.  
**Principal investigator:** José Abel Flores.

	<p><b>Role:</b> Team member. Use of statistical analysis to develop a transfer function to use coccolith assemblages as paleotemperature proxy.</p>
2007-2010	<p>Paleoceanographic evolution of the western Mediterranean during the last five climatic cycles from the material retrieved during PROMESS I (UE) campaign (CGL2006-10593). University of Salamanca, Spain.</p> <p><b>Principal investigator:</b> Francisco Javier Sierra.</p> <p><b>Role:</b> Team member. Use of micropaleontology (benthic and planktic foraminifer assemblages) as paleoclimate proxy.</p>
2006-2007	<p>Laguna Salada Drilling Project in Northern Baja California, Mexico: High-Resolution Stratigraphy of a Quaternary Climatic Record (U 42137-F). Ensenada Center for Scientific Research and Higher Education, Mexico.</p> <p><b>Principal Investigator:</b> Juan Contreras.</p> <p><b>Role:</b> Team member. Use of diffuse spectral reflectance analysis on lacustrine sediments as paleoclimate proxy.</p>
2004 / 2006	<p>Climatic change and ecologic response to California Current variability from decadal to millennial scales (635229-T). Ensenada Center for Scientific Research and Higher Education, Mexico.</p> <p><b>Principal Investigator:</b> Juan Carlos Herguera.</p> <p><b>Role:</b> Team member. Use of diffuse spectral reflectance and bulk sediment analysis in marine environments as paleoclimate proxies</p>
2003 / 2004	<p>Reconstruction of Tropical and Subtropical Paleoceanographic Dynamics with Decadal to Centenary Resolutions in the Mexican Pacific Ocean (G-35229-T). Ensenada Center for Scientific Research and Higher Education, Mexico.</p> <p><b>Principal Investigator:</b> Juan Carlos Herguera.</p> <p><b>Role:</b> Team member. Laboratory technician.</p>

### Oceanographic campaigns

07-2007 / 07-2007	Campaign on the Mexican conservation project of "vaquita marina" in the Cortés Sea, Mexico. <b>Ecosound area</b>
04-2007 / 05-2007	IMECOCAL 04 07. Mexican research of California Current. B/O Francisco de Ulloa. <b>Physical oceanography area</b>
04-2003 / 04-2003	IMECOCAL 03 04. Mexican research of California Current. B/O Francisco de Ulloa. <b>Biological oceanography area</b>
02-2003 / 02-2003	IMECOCAL 03 01/02. Mexican research of California Current. B/O Francisco de Ulloa. <b>Chemical oceanography area</b>

## Attendance at conferences

12th International Conference on Paleoceanography. 2016. Utrecht, Netherlands  
European Geosciences Union General Assembly. 2014. Vienna, Austria.  
11th International Conference on Paleoceanography. 2013. Barcelona, Spain  
European Geosciences Union General Assembly. 2012. Vienna, Austria.  
Joint RCMNS-RCANS Interim Colloquium. 2011. Salamanca, Spain.  
European Geosciences Union General Assembly. 2011. Vienna, Austria.  
10th International Conference on Paleoceanography. 2010. Scripps, San Diego, USA.  
Reunión Anual de la Unión Geofísica Mexicana 2008. Puerto Vallarta, Mexico.  
American Geophysical Union. 2004. San Francisco, USA

## Laboratory equipment and techniques

Equipment	CHN elemental analyzer, ICP-OES, Gas chromatography, HPLC, UV-VIS Spectrophotometer, X-ray microtomography in SEM, GC-MS, XRF, inorganic carbon analysis by means of Coulombmeter procedure.
Techniques	Acid digestion of marine sediments, opal extraction protocol, phosphorous sequential extraction, liquid-solid extraction of organic compounds in sediments, HPLC separation of organic compounds.

## Data processing

Software packages	MATLAB programming, STATISTICA, AnalySeries.
Statistical analysis	Multivariate exploratory techniques (e.g. Canonical correlation analysis, Anova/Manova, PCA, cluster analysis), Stationary time series analysis, Non-stationary time series analysis (Wavelet), cross coherence analysis, spectrogram analysis, singular spectral analysis.

## Expertise with oceanographic proxies

$\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  isotopes on benthic and planktic foraminifer shells, benthic and planktic foraminifer assemblages, organic/inorganic carbon, biogenic opal, trace and major sedimentary elements (Fe, Al, Ti, Sr, K, Ba, Mg, P), biomarkers (alkenone, n-alkane and  $\delta^{13}\text{C}$  isotopes on n-alkanes), phosphorous cycling, visible reflectance on sediment cores

## Articles published

[Cortina, A.](#), Filippelli, G., Ochoa, D., Sierro, F.J., Flores J.A and J. O. Grimalt. 2018. Climate-driven changes in sedimentation rate influence phosphorous burial along continental margins of the northwestern Mediterranean. *Palaeogeography, Palaeoclimatology and Palaeoecology* 500, 106-116. doi: 10.1016/j.palaeo.2018.03.010.

Rama-Corredor O., [Cortina, A.](#), Martrat, B., Lopez, J.F. and Grimalt, J.O. 2018. Removal of bias in C<sub>37</sub> alkenone-based sea surface temperature measurements by high-performance liquid chromatography fractionation. *Journal of Chromatography A* 1567, 90-98. doi: 10.1016/j.chroma.2018.07.004.

Rigual-Hernández, A.S., Pilskan, C., [Cortina, A.](#), Abrantes, F. and Armand L.K. Diatom species fluxes in the seasonally ice-covered Antarctic Zone: New data from offshore Prydz Bay and comparison with other regions from the eastern Antarctic and western Pacific sectors of the Southern Ocean. 2018. *Deep Sea Research Part II*. doi: 10.1016/j.dsr2.2018.06.005

Ochoa, D., Sierro, F.J., Hilgen F.J., [Cortina, A.](#), Lofi, J, Kouwenhoven, T., and Flores, J.A. Origin and implications of orbitally-induced sedimentary cyclicity in Pliocene well-logs of the Western Mediterranean. *Marine Geology*, 403, 150-164. doi: 10.1016/j.margeo.2018.05.009

[Cortina, A.](#), Grimalt, J.O., Martrat, B., Sierro, F.J., Rigual-Hernández, A.S., Ballegeer, A.M. and Flores, J.A. 2016b. The impact of the ice-sheets dynamics in western Mediterranean environmental conditions during Terminations. An approach based on terrestrial long chain n-alkanes deposited in the upper slope of the Gulf of Lions. *Chemical Geology* 430, 21-23. doi: 10.1016/j.chemgeo.2016.03.015

[Cortina, A.](#), Grimalt, J.O, Martrat, B., Rigual-Hernandez, A.S., Sierro, F.J. and Flores, J.A. 2016a. Anomalous SST warming during MIS 13 in the Gulf of Lions (northwestern Mediterranean Sea). *Organic Geochemistry* 92, 16-23. doi: 10.1016/j.orggeochem.2015.12.004

[Cortina, A.](#), Sierro, F.J., Flores, J.A., Martrat, B. and Grimalt, J.O. 2015. The response of SST to insolation and ice-sheet variability from MIS 3 to MIS 11 in the northwestern Mediterranean Sea (Gulf of Lions). *Geophysical Research Letters* 42. doi: 10.1002/2015GL065539

Rigual-Hernández, A.S., Trull, T.W., Bray, S.G., [Cortina, A.](#) and Armand, L.K.A. 2015. Latitudinal and temporal distributions of diatom populations in the pelagic waters of the Subantarctic and Polar Frontal zones of the Southern Ocean and their role in the biological pump, *Biogeosciences*, 12, 5309-5337, doi:10.5194/bg-12-5309-2015.

[Cortina, A.](#) and Herguera, J.C. 2014. Mid-to-Late Holocene organic carbon export variability at the southern boundary of the California Current: An approach based on diffuse spectral reflectance of marine sediment cores. *Palaeogeography, Palaeoclimatology and Palaeoecology* 408, 1-10.

[Cortina, A.](#), Sierro, F.J., Filippelli, G., Flores, J.A and Berné, S. 2013. Changes in planktic and benthic foraminifer assemblages in the Gulf of Lions, off South France: Response to climate and sea level change from MIS 6 to MIS 11. *Geochemistry, Geophysics, Geosystems* 14, doi:10.1002/ggge.20096

[Cortina, A.](#), Sierro, F.J., González-Mora, B., Assioli, A. and Flores, J.A. 2011. Impact of climate change and sea level changes on the ventilation of intermediate water and benthic foraminifer assemblages in the Gulf of Lions, off South France, during MIS 6 and 7. *Palaeogeography, Palaeoclimatology and Palaeoecology* 309, 215-228.

Saavedra-Pellitero, M., Flores, J.A., Lamy, F., Sierro, F.J. and [Cortina, A.](#) 2011. Coccolithophore estimates of paleotemperature and paleoproductivity changes in the southeast Pacific over the past 27 kyr. *Paleoceanography* 26, PA1201.

#### Articles in prep

[Cortina, A.](#), Grimalt, J.O., Casado, M., Martrat, B., Sierro, F.J., Flores J.A., Cacho, I. and Canals, M. Persistence of the interhemispheric seesaw along the last 800.000 kyr.

[Cortina, A.](#), Grimalt, J.O., Casado, M., Martrat, B., Sierro, F.J., Flores J.A., Cacho. Organic Rich Layer deposition in the Western Mediterranean Sea during the last eight climate cycles.

[Cortina, A.](#), Grimalt, J.O. and Martrat, M. The onset of amplification of millennial-scale variability.