

Curriculum Vitae

Juan Carlos Afonso

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Personal information

Marital status: married with children
Citizenship (multiple): Spanish, Australian, Argentinian

Education

October 2002 - October 2006, Ph.D. Earth Sciences, Carleton University, Ottawa (**University medal**). Thesis title: "Thermal, density, seismological and rheological structure of the lithospheric- sublithospheric mantle from combined petrological-geophysical modelling: Insights on lithospheric stability and the initiation of subduction"

1997-2002 Lic. (M.Sci. equivalent) Geology, Universidad Nacional de la Patagonia San Juan Bosco (U.N.P.S.J.B.), Comodoro Rivadavia (**University award**)

Employment/Academic History

2018 - 2021. Professor, Head of the Geophysics and Geodynamics Group, Department of Earth and Environmental Sciences, Macquarie University, Sydney, Australia.

2016 - 2020. Adjunct Professor, Centre of Excellence for Earth Evolution and Dynamics (CEED), University of Oslo, Norway.

2017 - 2018. Head of Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia.

2016 - 2017. Associate Professor and Deputy Head of Department, Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia.

2014 - 2015. Senior Lecturer, Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia.

2010 - Collins Lecturer (Honorary), Department of Earth Sciences, Carleton University, Ottawa, Canada.

2009 - 2014. Lecturer, Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia.

2007 - 2009. Post-doctoral Fellow (CSIC), Institute of Earth Sciences "Jaume Almera", Barcelona, Spain.

Awards and honors received

2021 – Elected member of the Anton Hales medal committee (by invitation) of the Australian Academy of Sciences.

2019 - **Early Career Scientist Award from the International Union of Geodesy and Geo- physics (IUGG)**. <https://lighthouse.mq.edu.au/article/may-2019/Diamonds,-volcanos-and-a-rock-star-what-a-new-map-ofthe-earths-interior-will-reveal>

2019 - **Leadership in Research Award**, Faculty of Science and Engineering, Macquarie University. 2019 - Keynote (honorary) lecturer, Department of Astronomy and Geophysics, La Plata, Argentina.

2017 - **Anton Hales Medal from the Australian Academy of Sciences**.

<https://www.science.org.au/supporting-science/awards-and-opportunities/anton-hales-medal>

2016 - Elected member of the editorial board for Geophysical Journal International (by invitation). 2016 - Adjunct Professor in the Centre of Excellence CEED, University of Oslo (by invitation).

2015 - Member of the Big History Program, Macquarie University (by invitation). 2014 - Member of the UNCOVER Geoscience Committee, Australia (by invitation).

2014 - Member of the Australian ANSIR/AuScope Access Committee, Australia (by invitation).

2014 - Member of the Solid Earth Geophysics Committee; Specialist Group of the Geol. Soc. Australia (by invitation).

2013 - **Outstanding Young Scientist Award of the European Geosciences Union (Geodynamics Division)** <https://www.egu.eu/awards-medals/division-outstanding-ecs-award/2013/juan-c-afonso/>

2010 - Collins (honorary) Lecturer, Department of Earth Sciences, Carleton University, Ottawa, Canada.

2010 - Finalist of the Tectonics Division *Outstanding Young Scientist Award at EGU Union level*.

2006 - **Carleton University Medal** for outstanding graduate work at doctoral level (only one medal awarded at each convocation ceremony, when merited, to a graduating student for outstanding academic achievements at the Ph.D. level).

2003/2004 - 2004/2005 - 2005/2006 - Ontario Graduate Scholarship (OGS) for international students (\$15,000/year, only 60 scholarships for all universities in Ontario).

2006 - European Science Foundation under the EUROCORES Programme EUROMARGINS (travel grant).

2004 - GAC-MAC Graduate Scholarship endowed by the Geological Association of Canada and the Mineralogical Association of Canada for excellence in graduate studies (\$900).

2002/2003 - Indira Gandhi Memorial Fellowship. This award is awarded annually to the most outstanding international student entering or enrolled in a graduate program at Carleton University (including all departments, \$10,000).

2002/2005-2005/2006 - Carleton University Scholarship, Dean of Graduate Studies (\$7,000/year).

2002/2003 - 2003/2004 - 2004/2005 -Carleton University Academic Excellence Scholarship for Inter- national Students in recognition of the excellent academic record (\$5,000).

2002 - Repsol - YPF Academic Excellence National Scholarship (only one scholarship per University)in recognition of an outstanding academic performance and participation as a student in the XV Congreso Geológico Argentino (XV Argentinean Geological Congress), El Calafate, Santa Cruz, Argentina (\$ 1,000 honorarium, declined).

2002 - University Award from the Universidad Nacional de la Patagonia San Juan Bosco (U.N.P.S.J.B.)for having reached the second highest score of the 2002 class (including all departments) and the highest score of the 2002 Geology class (9.35 out of 10).

Publications

Total number of publications: 75 + 5, submitted/in review, including *Nature Geoscience*, *Geology*, and *Earth and Planetary Science Letters*

Total citations (as of July 2021): > 3400 H-index: 33 (Google Scholar)

Publications in review/accepted pending revisions

Waszek, L., Tauzin, B., Schmerr, N., Ballmer, M., **Afonso, J.C.**, A poorly mixed mantle and its thermal state inferred from seismic waves, *Nature Geoscience* (accepted 07/21)

Afonso, J.C., Ben-Mansour, W., Griffin, W.L. et al., Thermochemical structure and evolution of cratonic lithosphere in Central and South Africa, *Nature Geoscience* (in review)

Manassero, M.C., **Afonso, J.C.**, Zyserman, F., Zlotnik, S., Fomin, I., A Reduced Order Approach for Probabilistic Inversions of 3D Magnetotelluric Data II: Joint inversion of MT and Surface-Wave Data, *J. Geophys. Res.* (accepted pending minor revisions, <https://www.essoar.org/doi/abs/10.1002/essoar.10506342.2>)

Oliveira, B., **Afonso, J.C.**, Klocking, M., Melting conditions and mantle source composition from probabilistic joint inversion of major and rare earth element concentrations, *Geochimica et Cosmochimica Acta* (accepted pending revisions)

Zhang, A., Guo, Z., **Afonso, J.C.**, Handley, H., Dai, H., Yang, Y., Chen, J., Lithosphere-asthenosphere interactions beneath Northeast China and the origin of its intraplate volcanism, *Geology* (in review)

Book chapters

Afonso, J.C., Moorkamp, M. and Fulla, J. (2016), Imaging the Lithosphere and Upper Mantle: Where we are at and where we are going (invited chapter). In **"Integrated imaging of the Earth"**, M. Moorkamp, P. Lelievre, N. Linde, and A. Khan (Editors), AGU Monograph 218, Wiley, AGU book.

Afonso, J.C. and Zlotnik, S. (2011), The subductability of continental lithosphere: the before and after story (invited chapter). In Brown, D. and Ryan, P. (eds), **"Arc-continent collision"**, Springer's series *Frontiers in Earth Sciences*, Berlin.

Brown, D., Ryan, P., **Afonso, J.C.**, Boutelier, D., Burg, J.P., Byrne, T., Calvert, A., Cook, F., DeBari, S., Dewey, J.F., Gerya, T.V., Harris, R., Herrington, R., Konstantinovskaya, E., Reston, T. and Zagorevski, A. (2011), Arc-continent collision: The making of an orogen. In Brown, D. and Ryan, P. (eds), **"Arc-continent collision"**, Springer's series *Frontiers in Earth Sciences*, Berlin.

Refereed publications

Yang, X., Li, Y., **Afonso, J.C.**, Yingjie, Y., Zhang, A. (2021), Thermochemical State of the Upper Mantle Beneath South China From Multi-Observable Probabilistic Inversion, *J. Geophys. Res.*, 126, e2020JB021114. <https://doi.org/10.1029/2020JB021114>

Pamato M.G., Novella D., Jacob D.E., Oliveira B., Greene S., **Afonso, J.C.**, Favero M., Stachel T., Pearson D.G., Alvaro, M., Nestola F. (2021), Re-Os isotopes of sulphide inclusions provide true age of diamonds, *Geology*, doi: <https://doi.org/10.1130/G48651.1>

Oliveira, B. Griffin, W.L., Gain, S., Saunders, M., Shaw, J., Toledo, V., **Afonso, J.C.**, O'Reilly, S.Y. (2021), Ti³⁺ in corundum: Tracer of crystal growth in a highly reduced magma, *Scientific Reports*, 11, 2439, <https://doi.org/10.1038/s41598-020-79739-4>

Fulla J., Negrodo, A., Charco, M., Palomeras, I., Villaseor, A., **Afonso, J.C.** (2021) The topography of the Iberian Peninsula from integrated geophysical-petrological multi-data inversion, *Phys. Earth Planet. Int.*, 314, doi.org/10.1016/j.pepi.2021.106691

Dai, H-K., Oliveira, B., Zheng, J-P., Griffin, W.L., **Afonso, J.C.**, Xiong, Q., O'Reilly, S.Y. (2021), Melting dynamics of Late Cretaceous lamprophyres in central Asia suggest a mechanism to explain many continental intraplate basaltic suite magmatic provinces, *J. Geophys. Res.*, doi.org/10.1029/2021JB021663

Manassero, M.C., **Afonso, J.C.**, Zyserman, F., Zlotnik, S., Fomin, I. (2020) A Reduced Order Approach for Probabilistic Inversions of 3D Magnetotelluric Data I: General Formulation, *Geophys. J. Int.*, ggaa415, <https://doi.org/10.1093/gji/ggaa415>

Zhang, A., Guo, Z., **Afonso, J.C.**, Yang, Y., Yang, B., Xu, Y. (2020), The thermochemical structure of the Dabie Orogenic Belt from multi-observable probabilistic inversion. *Tectonophysics*, 787, <https://doi.org/10.1016/j.tecto.2020.228478>.

Kumar, A., Fernandez, M., Jimenez-Munt, I., Torne, M., Verges, J., **Afonso, J.C.** (2020), Lit- Mod2D 2.0: An improved tool for the interpretation of upper mantle anomalies. *Geochem., Geo-phys., Geosys.*, 21, e2019GC008777, <https://doi.org/10.1029/2019GC008777>

Galabert, O., Zlotnik, S., **Afonso, J.C.**, Diez, P. (2020), Ultra-fast Stokes flow simulations for geophysical-geodynamic inverse problems and sensitivity analyses based on reduced order modelling. *J. Geophys. Res., Solid Earth*, 125, e2019JB018314. <https://doi.org/10.1029/2019JB018314>.

Oliveira, B., **Afonso, J.C.**, Thilac, R. (2020) A disequilibrium reactive transport model for mantle magmatism. *J. Petrol.*, ega067, <https://doi.org/10.1093/petrology/egaa067>.

Tilhac, R., Oliveira, B., Griffin, W.L., O'Reilly, S.Y., Schaefer, B.S., Alard, O., Ceuleneer, G., **Afonso, J.C.**, Grgoire, M. (2020), Reworking of old continental lithosphere: unradiogenic Os and decoupled Hf-Nd isotopes in sub-arc mantle pyroxenites. *Lithos*, 354-355, 105346, [10.1016/j.lithos.2019.105346](https://doi.org/10.1016/j.lithos.2019.105346).

Zhang, A., **Afonso, J.C.**, et al. (2019) The deep lithospheric structure of the Junggar terrane, NW China: Implications for its origin and tectonic evolution. *J. Geophys. Res.*, <https://doi.org/10.1029/2019JB018302>.

Szwillus, W., **Afonso, J. C. C.**, Ebbing, J., Mooney, W. D. (2019), Global crustal thickness and velocity structure from geostatistical analysis of seismic data. *J. Geophys. Res.*, 124, 1626-1652. <https://doi.org/10.1029/2018JB016593>

Afonso, J.C., Salajegheh, F., Szwillus, W., Ebbing, J., Gaina, C. (2019), A global reference model of the lithosphere and upper mantle from joint inversion and analysis of multiple data sets. *Geophys.J. Int.*, 217, 3, 1602-1628, <https://doi.org/10.1093/gji/ggz094>

Grose, C. J., and **Afonso, J. C.** (2019), New constraints on the thermal conductivity of the upper mantle from numerical models of radiation transport. *Geochemistry, Geophysics, Geosystems*, 20. <https://doi.org/10.1029/2019GC008187>

Grose, C and **Afonso, J.C.** (2019), Chemical Disequilibria, Lithospheric Thickness, and the Source of Ocean Island Basalts. *J. Petrol.*, 60, 4, 755-790, <https://doi.org/10.1093/petrology/egz012>

Tauzin, B., Kim, S., **Afonso, J.C.**, (2018) Multiple phase changes in the mantle transition zone beneath northeast Asia: Constraints from teleseismic reflected and converted body waves. *J. Geophys. Res. Solid Earth*, 123. <https://doi.org/10.1029/2017JB015238>.

Qashqai, M., **Afonso, J.C.**, Yang, Y. (2018), Physical state and structure of the crust beneath western-central US from multi-observable probabilistic inversion. *Tectonics, special issue*, 37, 3117-3147. <https://doi.org/10.1029/2017TC004914>

Jones, A. G., **Afonso, J.C.**, Fullea, J. (2017), Geochemical and geophysical constraints on the dynamic topography of the Southern African Plateau. *Geochem. Geophys. Geosyst.*, 18, [doi:10.1002/2017GC006908](https://doi.org/10.1002/2017GC006908).

Oliveira, B., **Afonso, J.C.**, Zlotnik, S., Diez, P. (2017). Numerical Modelling of Multi-Phase Multi-Component Reactive Transport in the Earth's interior. *Geophys. J. Int.*, ggx399, <https://doi.org/10.1093/gji/ggx399>

Giuliani, A., et al. (2017) Southwestern Africa on the burner: Pleistocene carbonatite volcanism linked to deep mantle upwelling in Angola, *Geology*, 45 (11): 971974. doi: <https://doi.org/10.1130/G39344.1>

Afonso, J.C., Rawlinson, N., Yang, Y., Schutt, D.L., Fulla, J., Jones, A.G., Griffin., W.L. (2016), 3D multi-observable probabilistic inversion for the compositional and thermal structure of the litho- sphere and upper mantle III: Thermochemical Tomography in the Western-Central US. *J. Geophys. Res.*, 121, 73377370, doi:10.1002/2016JB013049.

Qashqai, M., **Afonso, J.C.**, and Y. Yang (2016), The crustal structure of the Arizona Transition Zone and southern Colorado Plateau from multiobservable probabilistic inversion, *Geochem. Geophys. Geosyst.*, 17, 43084332, doi:10.1002/2016GC006463.

Zhang, S., Griffin, W.L., Yang, Y., Luo, Y., Zhu, L., **Afonso, J.C.**, Lei, B. (2016), How did the Dabie Orogen Collapsed? Insights from 2D magnetotelluric imaging. *J. Geophys. Res.*, 121, 51695185, doi:10.1002/2015JB012717.

Guo, Z., **Afonso, J.C.**, Qashqai, M., Yang, Y., Chen, J., (2016), Thermochemical structure of the North China Craton from multi-observable probabilistic inversion: extent and causes of cratonic lithosphere modification. *Gondwana Res.*, 37, 252265.

Tunini, L., Jimenez-Munt, I., Fernandez, M., Verges, Villasenor, A., **Afonso, J.C.**, (2016), Geophysical-petrological model of the crust and upper mantle in the India-Eurasia collision zone. *Tectonics*, 35, 1642-1669.

Griffin, W.L., **Afonso, J.C.**, et al., (2016). Mantle recycling: The transition zone metamorphism of Tibetan ophiolitic peridotites and its tectonic implications. *J. Petrol.*, 57, 655-684, doi: 10.1093/petrology/egw011.

Oliveira, B., **Afonso, J.C.**, Zlotnik, S., (2016). A Lagrangian-Eulerian finite element algorithm for multi-phase advection-diffusion-reaction problems with phase change. *Computer Methods in Applied Mechanics and Engineering*, 300, 375-401.

Guo, Z., Chen, Y.J., Ning, J. Yang, Y., **Afonso, J.C.**, Tang, Y. (2016). Seismic evidence of on- going sublithosphere upper mantle convection for intra-plate volcanism in Northeast China. *Earth Planet. Sci. Lett.*, 433, 31-43.

Afonso, J.C., Zlotnik, S., Diez, P. (2015), An efficient and general approach for implementing thermodynamic phase-equilibria information in geophysical and geodynamic studies. *Geochem. Geo- phys. Geosys.* , 16, doi:10.1002/2015GC006031.

Whittaker, J.M., **Afonso, J.C.**, Masterton, S., Muller, R.D., Wessel, P., Williams S.E., Seton M. (2015) Ridge-plume interactions: linking migrating ridges with the deep and shallow mantle. *Nature Geosci.*, 8, 479-484.

Carballo, A., Fernandez, M., Jimenez-Munt, I., Torne, M., Verges, J., Melchiorre, M., Pedreira, D., **Afonso, J.C.**, Garcia-Castellanos, D., Diaz, J., Villaseor, A., Pulgar, J.A., Quintana, L., (2015). From the North-Iberian margin to the Alboran Basin: A lithosphere geo-transect across the Iberian Peninsula. *Tectonophysics*, 663, 399-418.

Griffin, W.L., McGowan, N.M., Gonzalez-Jimenez, J.M., Belusova, E., Howell, D., **Afonso, J.C.**, Yang, J.S., Shi, R., O'Reilly, S., Pearson, N., (2015). Transition-zone mineral assemblages in Peri- dotite Massifs, Tibet: Implications for collisional-zone dynamics and orogenic peridotites. *Acta Geol. Sinica*, 89:90-91.

Pedreira, D., **Afonso, J.C.**, Pulgar, J.A., Gallastegui, J., Garca-Castellanos, D., Jimnez-Munt, I., Carballo, A., Fernandez, M., Semprich, J., (2015). Geophysical-petrological modeling of the lithosphere beneath the Cantabrian Mountains and North-Iberian margin: geodynamic implications. *Lithos*, 230, 46-68.

Grose, C.J. and **Afonso, J.C.** (2015). The hydrothermal power of oceanic lithosphere. *Solid Earth*, 6, 1131-1155.

McGowan, N.M., Griffin, W.L., Gonzalez-Jimenez, J.M., Belusova, E., **Afonso, J.C.**, Shi, R., McCammon, C.A., Pearson, N., O'Reilly, S. (2015). Tibetan chromitites: excavating the slab graveyard. *Geology*, 43, 179-182, doi:10.1130/G36245.1.

Shan, B., **Afonso, J.C.**, Yang, Y., Grose, C.J., Zheng, Y., Xiong, X., The compositional and thermal structure of the lithosphere and upper mantle beneath South China: Results from multi-observable probabilistic inversion, *J. Geophys. Res.*, 119 (11), 8417-8441.

Jones, A.G., **Afonso, J.C.**, Fullea J., Salajegheh, F. (2014), The lithosphere-asthenosphere system beneath Ireland from integrated geophysical-petrological modelling I: observations, 1D and 2D hypothesis testing. *Lithos*, 189, 28-48.

Fullea J., Muller, M.R., Jones, A.G., **Afonso, J.C.** (2014). The lithosphere-asthenosphere system beneath Ireland from integrated geophysical-petrological modelling II: 3D thermal and compositional structure. *Lithos*, 189, 49-64.

Adam, J., Locmelis, M., **Afonso, J.C.**, Rushmer, T., and M. L. Fiorentini (2014). The capacity of hydrous fluids to transport and fractionate incompatible elements and metals within the Earth's mantle, *Geochem. Geophys. Geosyst.*, 15, 22412253, doi:10.1002/2013GC005199

O'Reilly, S.Y., **Afonso, J.C.**, Griffin, W.L. (2014). Preface, *Lithos*, 189, 1,

Afonso, J.C., Fullea, J. Yang, Y., Connolly, J.A.D., Jones, A.G. (2013). 3D multi-observable probabilistic inversion for the compositional and thermal structure of the lithosphere and upper mantle II: General methodology and resolution analysis. *J. Geophys. Res.*, 118, 16501676, doi:10.1002/jgrb.50123.

Afonso, J.C., Fullea, J., Yang, Y., Griffin, W.L., Jones, A.G., Connolly, J.A.D., O'Reilly, S.Y. (2013). 3D multi-observable probabilistic inversion for the compositional and thermal structure of the lithosphere and upper mantle I: a priori information and geophysical observables. *J. Geophys. Res.*, 118, 25862617, doi:10.1002/jgrb.50124.

Grose, C. J. and **Afonso, J.C.** (2013). Comprehensive plate models for the thermal evolution of oceanic lithosphere. *Geochem. Geophys. Geosyst.*, 14, 9, doi:10.1002/ggge.20232.

Handley, H. K., Turner, S., Dosseto, A., Haberlah, D., **Afonso, J.C.** (2013). Considerations for U-series dating of sediments: insights from Flinders Ranges, South Australia. *Chemical Geology*, 340, 4048.

Fullea, J., Lebedev, S., Agius, M.R., Jones, A.G., **Afonso, J.C.** (2012). Lithospheric structure in the Baikal-central Mongolia region from integrated geophysical-petrological inversion of surface-wave data and topographic elevation. *Geochem. Geophys. Geosyst.*, 13, Q0AK09, doi:10.1029/2012GC004138

Handley, H. K., Turner, S., **Afonso, J.C.**, Dosseto, A., Cohen, T. (2012). Sediment residence times constrained by Uranium-series isotopes: a critical appraisal of the comminution approach, *Geochim. Cosmochim. Acta*, 103, 245262.

Afonso, J.C. and Schutt, D., (2012). The effects of polybaric partial melting on the thermophysical properties of mantle restites. *Lithos*, 134-135, 289-303.

Jimnez-Munt, I., Fernàndez, M., Vergés, J., García-Castellanos, D., Fullea, J., Pérez-Gussinyé, **Afonso, J.C.** (2011). Decoupled crust-mantle accommodation of Africa-Eurasia convergence in the NW-Moroccan Margin. *J. Geophys. Res.*, 116, B08403, doi:10.1029/2010JB008105

Schinella, E., O'Neill, C., **Afonso, J.C.**, (2011). Processes forming volcanic topography at Alta Regio, Venus. In: Cairns, I. and Short, W. (eds.), Proceedings of the 10th Australian Space Science Conference, Brisbane, 105-118.

O'Reilly, S.Y., **Afonso, J.C.**, Griffin, W.L., van der Lee, S. (2010). Preface, *Lithos*, 120, vii-viii, doi:10.1016/j.lithos.2010.09.017.

Jiménez-Munt, I., Fernàndez, M., Vergés, J., **Afonso, J.C.**, García-Castellanos, D., Fullea, J. (2010), The lithospheric structure of the Gorringer Bank: insights into its origin and tectonic evolution. *Tectonics*, 29, TC5019, doi:10.1029/2009TC002458.

Ayarza, P., Palomeras, I., Carbonell, R., **Afonso, J.C.**, Simancas, F. (2010), A wide angle uppermantle reflector in SW Iberia: some constraints on its nature. *Phys. Earth Planet. Int.*, 181, 88-102.

Afonso, J.C., Ranalli, G., Fernàndez, M., Griffin, W.L., O'Reilly, S.Y., Faul, U.H. (2010), On the Vp/Vs - Mg# correlation in mantle peridotites: implications for the identification of thermal and compositional anomalies in the upper mantle. *Earth Planet. Sci. Lett.*, 289, 606-618.

Fullea, J., Fernàndez, M., **Afonso, J.C.**, Vergés, J., Zeyen, H. (2010), The structure and evolution of the lithosphere-asthenosphere boundary beneath the Atlantic-Mediterranean Transition Region. *Lithos*, 120, 74-95.

Fernàndez, M., **Afonso, J.C.**, Ranalli, G. (2010). The deep lithospheric structure of the Namibian volcanic margin. *Tectonophysics*, 481, 68-81.

Bielik, M., Tašárová, Z., Zeyen, H., Dererova, J., **Afonso, J.C.**, Csicsay, K. (2010). Improved Geophysical Image of the Carpathian-Pannonian Basin Region. *Acta Geod. Geophys. Hung.*, 45, 284-298, doi: 10.1556/AGeod.45.2010.3.3.

Griffin, W. L., O'Reilly, S.Y., **Afonso, J.C.**, Begg, G. (2009). The composition and evolution of lithospheric mantle: A re-evaluation and its tectonic implications. *J. Petrol.*, 50, 1185-1204, doi:10.1093/petrology/egn033.

Fullea, J., **Afonso, J.C.**, Connolly, J.A.D., Fernàndez, M., García-Castellanos, D., Zeyen, H. (2009). LitMod3D: an interactive 3D software to model the thermal, compositional, density, rheological, and seismological structure of the lithosphere and sublithospheric mantle. *Geochem. Geophys. Geosyst.*, 10, Q08019, doi:10.1029/2009GC002391.

Tašárová, A.Z., **Afonso, J.C.**, Bielik, M., Götze, H.-J., Hók, J. (2009). The lithospheric structure of the Western Carpathian-Pannonian Basin region based on the CELEBRATION 2000 seismic experiment and gravity modelling. *Tectonophysics*, 475, 454-469.

Afonso, J.C., Zlotnik, S., Fernàndez, M. (2008). The effects of compositional and rheological stratifications on small-scale convection under the oceans: implications for the thickness of the oceanic lithosphere and seafloor flattening. *Geophys. Res. Lett.*, 35, L20308, doi:10.1029/2008GL035419.

Zlotnik, S., **Afonso, J.C.**, Díez, P., Fernàndez, M. (2008). Small-scale instabilities under the oceans: implications for the evolution of the oceanic lithosphere and its expression in geophysical observables. *Phil. Mag.*, 88, 3197-3217.

Afonso, J.C., Fernàndez, M., Ranalli, G., Griffin, W.L., Connolly, J.A.D. (2008). Combined geophysical-petrological modelling of the lithospheric-sublithospheric upper mantle: methodology and applications. *Geochem. Geophys. Geosyst.*, 9, Q05008, doi:10.1029/2007GC001834.

Afonso, J.C., Ranalli, G., Fernàndez, M. (2007). Density structure and buoyancy of the oceanic lithosphere revisited. *Geophys. Res. Lett.*, 34, L10302, doi:10.1029/2007GL029515.

Afonso J.C. and Ranalli, G. (2005). Elastic properties of three-phase composites: analytical model based on the modified shear-lag model and the method of cells. *Comp. Sci. Technol.*, 65, 1265-1275. (see Erratum in *Comp. Sci. Technol.*, 65, 2281).

Afonso J.C., Ranalli, G., Fernàndez, M. (2005). Thermal expansivity and elastic properties of the lithospheric mantle: results from mineral physics of composites. *Phys. Earth Planet. Int.*, 149, 279-306.

Giacosa, R., **Afonso, J.C.**, Heredia, N., Paredes, J. (2005). Tertiary tectonics of the sub-Andean region of the North Patagonian Andes, Southern Central Andes of Argentina, (41 - 42 30S). *J. South. Am. Earth Sci.*, 20, 157-170.

Afonso J.C. and G. Ranalli (2004): Crustal and mantle strengths in continental lithosphere: is the jelly sandwich model obsolete? *Tectonophysics*, 394, 221-232.

Giacosa, R., Márquez, M., Nillni, A., Fernández, M., Fracchia, D., Parisi, C., **Afonso, J.C.**, Paredes, J., Sciutto, J.C. (2004). Litología y estructura del basamento ígneo-metamórfico del borde SO del Macizo Nordpatagónico al oeste del Río Chico, (Cushamen, Chubut, Argentina; 42° 10'S - 70° 30'O). *Rev. Asoc. Geol. Arg.*, 59, 569-577.

Selected solicited talks and invited seminars

- 2022 XXI Argentinian Geological Congress, Puerto Madryn, Argentina (keynote plenary speaker)
- 2021 DEEP 2021 International symposium on deep Earth exploration and practices, Nanjing, China (keynote speaker)
- 2021 MTNet webinars series "EMinars" (invited lecture)
- 2021 GEOTOP, UQAM, Montreal, Canada (invited seminar)
- 2020 Earth Observatory of Singapore, Singapore (invited seminar)
- 2020 Gordon Conference Mineral Systems, Barcelona, Spain (Keynote speaker)
- 2019 European Space Agency 3D Earth meeting, Dublin, Ireland (two invited talks)
- 2019 27th General Assembly IUGG, Montreal, Canada (*keynote lecture, ECS Award*)
- 2019 La Plata International School of Astronomy and Geophysics, Argentina (invited lecturer)
- 2019 Laboratory of Numerical Analysis, Univ. Polytech. Catalunya (invited seminar)
- 2019 Prospectors and Developers Association of Canada Convention, Toronto (invited course presenter)
- 2018 Goldschmidt Conference, Boston (two invited talks)
- 2018 Solomon Conference, Adelaide (keynote speaker)
- 2018 Geophysical Fluid Dynamics Group, ETH Zurich, (invited seminar)
- 2018 EGU, Union Symposia, Vienna, Austria (solicited presentation)
- 2018 Resources for Future Generations Conference, Vancouver (invited course presenter)
- 2017 Science at the Shine Dome, Australian Academy of Sciences (*acceptance presentation for the Anton Hales Medal*)
- 2017 University of Kiel (invited seminar)
- 2017 Bullard Labs, Cambridge University (invited seminar)
- 2017 EGU, Union Symposia, Vienna, Austria (solicited presentation)
- 2016 EGU, Union Symposia, Vienna, Austria (keynote presentation)
- 2016 25th ASEG-PESA-AIG Conference, Adelaide, Australia (keynote presentation)
- 2016 17th International Seismix Symposium, Aberdeen, Scotland (keynote presentation)
- 2015 AGU Fall Meeting, San Francisco, USA (keynote presentation w/ A. Jones)
- 2015 12th Annual Meeting of the Asia-Oceania Geosciences Society, Singapore (keynote presentation)
- 2014 AGU Fall Meeting, San Francisco, USA (solicited presentation w/ F. Darbyshire)
- 2014 Geoscience Australia, Canberra, Australia.
- 2013 EGU General Assembly, Vienna, Austria (*keynote presentation Outstanding Young Scientist Award*)
- 2013 Goldschmidt Conference, Florence, Italy (keynote presentation)
- 2013 Dublin Institute for Advanced Studies, Dublin, Ireland (invited seminar)
- 2013 Institute of Geophysics, Chinese Academy of Science, Wuhan, China (invited seminar)
- 2013 University of Science and Technology of China, Hefei, China (invited seminar)
- 2013 China University of Geosciences, Beijing, China (invited seminar)
- 2012 EGU General Assembly, Vienna, Austria (solicited presentation)
- 2012 Dublin Institute for Advanced Studies, Dublin, Ireland (Workshop on LitMod modeling)
- 2011 EGU General Assembly, Vienna, Austria (keynote presentation)
- 2011 AGU, Fall Meeting, San Francisco, USA (solicited presentation)
- 2010 Goldschmidt Conference, Knoxville, USA (keynote presentation; declined due to teaching commitments)
- 2010 Collins honorary lectures, Carleton University, Ottawa, Canada.

Abstracts and presentations in conferences

Over 330 presentations in national and international geoscience meetings.

Prestigious awards in 2013, 2017 and 2019

In 2013, the Geodynamic Division of the European Geoscience Union (EGU) selected me as the recipient of the prestigious **Outstanding Young Scientist Award** (OYSA) (<http://www.egu.eu/news/45/eguannounces-2013-awards-and-medals/>) for outstanding contributions to the understanding of the complex connections between the Earth's physical state and its signatures on geophysical, petrological, and geochemical observations through time (EGU Division Media Release).

In 2017, the Australian Academy of Sciences announced that I was the recipient of the **Anton Hales Medal** (<https://www.science.org.au/opportunities-scientists/recognition/honorific-awards/honorific-awardees/2017-awardees#hales>), the most prestigious award bestowed by the Australian Academy of Science to Australian early-career geoscientists. This medal was awarded to me based on my work on multi-observable inversion for the physical state of the Earth's interior.

In 2019, the International Union of Geodesy and Geophysics (IUGG) announced that I was the recipient of the prestigious **Early Career Scientist Award** (<http://www.iugg.org/honors/ecsawardees.php>) for outstanding contributions to seismology and physics of the Earth. This award is given every four years to a maximum of ten ECSs across all the disciplines of Geodesy and Geophysics. ***I am the only Australian scientist to have received this award.***

I have also received a number of other awards during my career, most of which are listed above in Section *Awards and honors received*

Selected grants and funding success

- As Partner Investigator (PI) in DeepNL Programme, Dutch Research Council (2021).
- As Partner Investigator (PI) in Task Force CoLibri of the Int. Lithosphere Program (2020).
- As Chief Investigator (CI) in ARC DP Project DP190102940 (2019)
- As CI in ARC Linkage Project LP170100233 (2018)
- As PI in Research and Innovation Staff Exchange (RISE) Call:H2020MSCARISE2017 (2017)
- As PI in European Space Agency ITT AO/1-8422/15/NL/SW: STSE 3D-Earth (2016)
- As CI in ARC Discovery Project 160103502 (2015)
- As CI in DAAD-Australia Research Cooperation Scheme (2015)
- As CI in the competitive MQ Research Infrastructure Block Grants scheme, Macquarie University(2014).
- As CI in the competitive MQ Research Development Grants scheme, Macquarie University (2014).
- As CI in the competitive MQ Research Infrastructure Block Grants scheme, Macquarie University(2013).
- As CI in ARC Discovery Project 120102372 (2012)
- As CI in the competitive MQ Research Infrastructure Block Grants scheme, Macquarie University (2012).
- As CI in ARC Discovery Project 110104145 (2011).
- As CI in MQ New Staff Grant scheme, Macquarie University (2010).
- As CI in MQ University Safety Net Grant (2010).

- As PI in Acciones Complementarias, Consejo Superior de Investigaciones Cientificas (CSIC), Spain(2008).
- As PI in CSIC Fundamental Research Grants scheme, Spain (2012)
- As CI in CCFS Project Two-phase flow within Earth's mantle: modelling, imaging and application to flat subduction settings (2011-2017)
- In 2010, I was part (as Associate Investigator) of the successful bid for the multi-million ARC Centre of Excellence for Core to Crust Fluid Systems.

- In addition to the competitive funding schemes mentioned above, my research has been and still is supported (multi-million funds) by numerous industry and government partners. Some of these include De Beers, Equinor, European Space Agency, CSIRO, Geoscience Australia, Canadian Geological Council and BHP. More details in the supporting documentation.

Professional experience and service

- 2021: Co-convenor S17 IASPEI symposium, IAGA-IASPEI Joint Scientific Assembly.
- 2021: Co-convenor AGU session DI008, Integrative Perspectives on Present-day Mantle Structure, San Francisco, US.
- 2019: Guest Editor of Sensors Special Issue "Space and Airborne Remote Sensing for Geo-hazards, Tectonics, and Earth Structure and Composition."
- 2019: Co-convenor IUGG JA9 Session, Montreal, Canada.
- 2019: Co-convenor AGU 81186 Session, San Francisco, US.
- 2017: Co-convenor of IAG-IASPEI 2017, Kobe, Japan.
- 2016-current: Editor of Geophysical Journal International, Oxford.
- 2016: Co-organizer of workshop Anisotropy and Dynamics of the Lithosphere-Asthenosphere System, Prague.
- 2016: Main Organizer of the EMCG Symposium, Australian Earth Science Convention, Adelaide.
- 2016: Co-organizer of the UNCOVER Workshop; Lithospheric Architecture Theme.
- 2009-current: Editor of EGU Journal Solid Earth.
- 2013-current: leader of Macquarie's Geophysics and Geodynamics Group (MG3).
- 2014-current: Member of the UNCOVER Geoscience Committee, Australia.
- 2014-current: Member of the ANSIR/AuScope Access Committee, Australia.
- 2014-2016: Member of the Solid Earth Geophysics Committee; Specialist Group of the Geol. Soc. Australia.
- 2014: Main organizer of the 1st Australian Workshop for Early and Mid-Career Geoscientists (<http://eps.mq.edu.au/emcg/>).
- 2013: Convener of Session SM4.7, EGU, Vienna.
- 2013: Convener of Session MR43A, AGU, San Francisco.
- 2013: Guest Editor of Lithos, Special Issue The Lithosphere and Beyond: a multidisciplinary spotlight.
- 2012: Convener of symposium 16.5, 34th Int. Geol. Congress, Brisbane.
- 2009-2012: EGU Division Officer (OSP Coordinator), Geodynamics Division.
- 2011: Main organizer of workshop ThermoDynaMix III, Dublin.
- 2010: Convener of session GD6.5, EGU.
- 2010: Guest Editor of Lithos, Special Issue Vol 120 "The Lithosphere - Asthenosphere boundary: nature, formation and evolution from Hadean to now".
- 2008: Main organizer of workshop ThermoDynaMix II, Barcelona.
- 2008: Convener of session SM8, EGU, Vienna.
- 2008: Convener of symposium EIL-03, 33rd Int. Geol. Congress, Oslo.

Developer, provider, and maintainer of open-source computational tools for geoscientific re-search *LitMod*, *LitMod3D*, *LitMod seis*, *LitMod 4INV* among others (Please refer to <https://www.juanafonso.com/software> for a complete list). Much of my current research includes the development of geophysical methodologies and in-house computational tools that I make available to the Earth Science community under open-source license (commercial licenses are also available). These include e.g. 2D finite element codes for integrated petrological-geophysical modelling (static and dynamic) of the lithosphere and upper mantle (e.g. *LitMod*), a 3D fully interactive code (*Lit-Mod3D*) for the same purposes, a multi-observable probabilistic inversion code (*LitMod 4INV*) and finite-element codes for advection-diffusion-reaction processes and multi-phase multi-component re-active flow for geochemical and thermomechanical simulations of geological processes. I am currently planning the writing of a book on numerical methods and inversion for geoscientists.

Serve regularly as reviewer for *Earth and Planetary Science Letters*, *Nature Geoscience*, *Geology*, *Journal of Geodynamics*, *Lithos*, *Tectonophysics*, *Geophys. Res. Lett.*, *G-cubed*, *J. Geophys. Res.*, *Geophys. J. Int.*, *Terranova*, *Geol. Soc. London.*, among others. I regularly review PhD theses from a number of Institutions around the world.

Supervision of MRes, PhDs and Postdocs

Elyse Schinella (PhD completed)
Chris J. Grose (PhD completed, *University Award*)
Anthony Lanati (MRes completed)
Mehdi Qashqai (PhD completed)
Javier Fulla (PhD, completed)
Chengxin Jiang (PhD completed, *University Award*)
Kai Wang (PhD completed)
Jun Xie (PhD completed)
Beñat Oliveira Bravo (PhD completed, *University Award*, *La Caixa Award*)
Constanza Manassero (PhD completed)
Lucas Gamertsfelder (MRes completed)
Byron Gear (MRes completed)
Thomas Connell (MRes, completed)
Alice Van Tilburg (MRes, completed)
Kelly Vaughn-Taylor (MRes, completed)
Olga Galabert (PhD completed)
Anqi Zhang (PhD completed)
Farshad Salajegheh (PhD candidate)
Marti Burcet (PhD candidate)
Xiaoyu Yang (PhD candidate)
Fatimah Abdulghafur (PhD candidate)
Dr. Bin Shan (Postdoc, now professor at Wuhan University, China)
Dr. Zhen Guo (Postdoc, now professor at Southern University of Science and Technology, China)
Dr. Mehdi Qashqai (Postdoc, now researcher at CSIRO)
Dr. Beñat Oliveira Bravo (Postdoc - current)
Dr. Ilya Fomin (Postdoc - current)
Dr. Walid Mansour (Postdoc - now at Washington State University)
Dr. Constanza Manassero (Postdoc, current)

Dr. Marthe Klocking (DAAD Postdoc - 2018)
Dr. Chongzhi Dong (CSC Postdoc, 2019)
Dr. Guangliang Yang (CSC Postdoc, 2019)

Professional Society Membership

Member, American Geophysical Union	2003-present
Member, European Geophysical Union	2005-present
Member, Geological Society of Australia	2014-present

Main references

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More references available upon request.