

Motivation Statement

My name is Víctor Cárdenes Van den Eynde, PhD Geology, and I want to propose my candidacy for the HSS board. Both my professional and academic careers have been focused on dimension stones. I have worked mainly with roofing slates, but also with other stones. In 2007 I followed a summer course on stone in heritage at the Zaragoza University (Spain) that changed the way I worked with stones. Since that, my research has been more and more aimed to historical and architectural heritage, and how I could use my knowledge to contribute to its preservation.

I became a HSS correspondent in 2014, and since then I have been regularly involved with the group. I have presented several communications and posters at the sessions hosted by the HSS: EGU (Wein) 2014 and 2017, 35th International Geological Congress (Cape Town) in 2016, Global Stone Congress (Ilheus) and the 1st Workshop on Heritage Stones (Salamanca), both in 2018. I have co-edited the special issue from Geoheritage *Heritage Stones and Geoheritage* (2019). I'm also attending to the 36th IGC in Delhi, where I will contribute to the scientific communications of our group. I have also been involved in the organization of the EGU 2017 session as a co-convener, and in the 1st Workshop on Heritage Stones, where I was part of the organization team. I have **highlighted in red** on my CV the publications related with the HSS activities and Heritage in general.

Some of the activities I will encourage in case I am elected as a member of the board are:

- 1- Compile samples of all GHSR designations. These samples can be used for educational purposes, for showing on conferences, and for creating a database.
- 2- Continue with the publication of special volumes in high quality scientific journals. It is essential to make our work visible.
- 3- Promote the dissemination of our research in other forums, such as dimension stone meetings. The general public, and especially the stone world, should know what we are doing.

Curriculum Vitae

Personal Information

Name: Víctor Cárdenes Van den Eynde
Date of Birth: 26-04-1972
Place of Birth: Las Palmas de Gran Canaria, Spain
Citizenship: Spanish
Gender: Male
Institution: Department of Geology, Oviedo University, Spain
Position: Researcher and partial time professor
Email: cardenesvictor@uniovi.es



Academic formation

1. **Ph.D. Geology** (2010-2012) University of Oviedo. Title of Thesis: **Roofing Slates: Petrography, Pathologies and Restoration**
2. **Master Degree in Engineering Geology and Geological Resources** (2009-2010) University of Oviedo. Title of Thesis: *Durability of Roofing Slate: Mechanical Behaviour during Freeze-Thaw Cycles*
3. **Master of Advanced Studies in Stratigraphy** (1999-2002) University Complutense of Madrid. Title of Thesis: *Geological applications to roofing slate quality: Iron sulphides oxidation*
4. **Degree in Geology** (end 1999) University Complutense of Madrid
5. **High School** (end 1991) Danderyds Gymnasium, Stockholm (Sweden) and Colmenar Viejo High School, Madrid (Spain)

Work Experience

1. **Post-doc researcher** (2018-2020) Programa Clarín, granted by the Asturias Government and the FICYT, Spain.
2. **Post-doc researcher** (2015-2016) Marie Skłodowska-Curie IEF, granted by the European Research Council (ERC).
2. **Post-doc researcher** (2014) Pegasus Marie Skłodowska-Curie Short, granted by the Research Foundation of Flanders (FWO), Belgium.
3. **Researcher** (durability of dimension stone) 2010 – 2011: University of Oviedo.
4. **Research Manager** (2006-2008) Slate Technological Center, Ourense, Spain.
5. **Geologist and Quality Manager** (2001-2006) Pizarras SAMACA S.A., Ourense, Spain.
6. **Post-degree fellowship** (1999-2001) National Museum of Natural Sciences, Madrid

Publications in peer reviewed journals (SCI)

1. Merinero R, Ortega L, Lunar R, Piña R, **Cárdenes V.** *Framboidal chalcopyrite and bornite constrain redox conditions during formation of their host rocks in the copper stratabound mineralization of Picachos, north-central Chile.* Ore Geology Reviews, 2019. 112.
2. **Cárdenes, V.**, Ponce de León, M., Rodríguez, X.A., and Rubio-Ordoñez, A., **Roofing Slate Industry in Spain: History, Geology, and Geoheritage.** Geoheritage, 2019. 11: p.19-34.
3. **Cárdenes, V.**, y Rubio-Ordoñez, A., *Discussion on "Utilization of X-ray computed microtomography to evaluate iron sulphide distribution in roofing slates"*. Quaterly Journal of Engineering Geology and Hydrogeology, 2018. 52: 137.

4. **Cárdenes, V.**, Lafuente, J.C., Merinero, R., and Rubio-Ordoñez, A., *Commentary: Does Blue Uniform Color Enhance Winning Probability in Judo Contests?*. *Frontiers in Psychology*, 2018. 9: p. 1-3.
5. **Cárdenes, V.** and Cnudde, J.P., *Closure to the discussion of "Roofing slate standards: A critical review", by V. Cárdenes et al.*, *Constr. Build. Mater.* 115 (2016) 93–104. *Construction and Building Materials*, 2017. 133: p. 545-546.
6. Merinero, R., **Cárdenes, V.**, Lunar, R., Boone, M.N., and Cnudde, V., *Representative size distributions of framboidal, euhedral, and sunflower pyrite from high-resolution X-ray tomography and scanning electron microscopy analyses*. *American Mineralogist*, 2017. 102 (3): p. 620-631.
7. Merinero, R. and **Cárdenes, V.**, *Theoretical growth of framboidal and sunflower pyrite using the R-package frambgrowth*. *Mineralogy and Petrology*, 2017. 112: p. 577-589.
8. **Cárdenes, V.**, Merinero, R., De Boever, W., Rubio-Ordóñez, Á., Dewanckele, J., Cnudde, J.P., Boone, M., Van Hoorebeke, L., and Cnudde, V., *Characterization of micropyrrite populations in low-grade metamorphic slate: A study using high-resolution X-ray tomography*. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 2016. 441: p. 924-935.
9. **Cárdenes, V.**, Cnudde, J.P., Wichert, J., Large, D., López-Munguira, A., and Cnudde, V., ***Roofing slate standards: A critical review***. *Construction and Building Materials*, 2016. 115: p. 93-104.
10. Rubio-Ordóñez, A., Gutiérrez-Alonso, G., Valverde-Vaquero, P., Cuesta, A., Gallastegui, G., Gerdes, A., and **Cárdenes, V.**, *Arc-related Ediacaran magmatism along the northern margin of Gondwana: Geochronology and isotopic geochemistry from northern Iberia*. *Gondwana Research*, 2015. 27 (1): p. 216-227.
11. Cnudde, V., De Kock, T., Boone, M., De Boever, W., Bultreys, T., Van Stappen, J., Vandevorde, D., Dewanckele, J., Derluyn, H., **Cárdenes, V.**, and Van Hoorebeke, L., ***Conservation studies of cultural heritage: X-ray imaging of dynamic processes in building materials***. *European Journal of Mineralogy*, 2015. 27 (3): p. 269-278.
12. **Cárdenes, V.**, Cnudde, V., and Cnudde, J.P., ***Iberian roofing slate as a global heritage stone province resource***. *Episodes*, 2015. 38 (2): p. 97-105.
13. **Cárdenes, V.**, Rubio-Ordóñez, Á., Wichert, J., Cnudde, J.P., and Cnudde, V., *Petrography of roofing slates*. *Earth-Science Reviews*, 2014. 138: p. 435-453.
14. **Cárdenes, V.**, Rubio-Ordóñez, Á., Monterroso, C., and Mateos, F.J., ***Guidelines for selecting roofing slate for the restoration of historical buildings and monuments: Two case studies***. *Journal of Cultural Heritage*, 2014. 15 (2): p. 203-208.
15. **Cárdenes, V.**, Mateos, F.J., and Fernández-Lorenzo, S., ***Analysis of the correlations between freeze–thaw and salt crystallization tests***. *Environmental Earth Sciences*, 2013. 71 (3): p. 1123-1134.
16. **Cárdenes, V.**, Rubio-Ordóñez, A., Monterroso, C., and Calleja, L., *Geology and geochemistry of Iberian roofing slates*. *Chemie der Erde - Geochemistry*, 2013. 73 (3): p. 373-382.
17. **Cárdenes, V.**, Mateos, F.J., and Paradelo, R., *Degradability of building stone: Influence of the porous network on the rate of dissolution of carbonate and evaporitic rocks*. *Journal of Cultural Heritage*, 2013. 14 (2): p. 89-96.
18. Rubio-Ordóñez, A., **Cárdenes, V.**, Rodríguez-Terente, L., Tormo, L., and García-Guinea, J., *Backscattered electron images, Cathodoluminescence and Raman spectroscopy study of phosphates and maskelynite from the H6 Cangas de Onis regolith breccia*. *Spectroscopy Letters*, 2012. 45: p. 135-140.
19. **Cárdenes, V.**, Prieto, B., Sanmartín, P., Ferrer, P., Rubio, A., and Monterroso, C., *Influence of Chemical-Mineralogical Composition on the Color and Brightness of Iberian Roofing Slates*. *Journal of Materials in Civil Engineering*, 2012. 24 (4): p. 460-467.
20. **Cárdenes, V.**, Monterroso, C., Rubio, A., Mateos, F.J., and Calleja, L., *Effect of freeze–thaw cycles on the bending strength of roofing slate tiles*. *Engineering Geology*, 2012. 129-130: p. 91-97.

21. **Cárdenes, V.**, Mateos, F.J., Rubio-Ordoñez, A., and Monterroso, C., *Ensayos normativos para la caracterización de patologías en pizarras para cubiertas*. Materiales de Construcción, 2011. 62 (306): p. 251-268.
22. Prieto, B., Ferrer, P., Sanmartín, P., **Cárdenes, V.**, and Silva, B., **Color characterization of roofing slates from the Iberian Peninsula for restoration purposes**. Journal of Cultural Heritage, 2011. 12 (4): p. 420-430.
23. **Cárdenes, V.**, Rubio-Ordoñez, A., López-Munguira, A., De la Horra, R., Monterroso, C., Paradelo, R., and Calleja, L., **Mineralogy and modulus of rupture of roofing slate: Applications in the prospection and quarrying of slate deposits**. Engineering Geology, 2010. 114 (3-4): p. 191-197.
24. **Cárdenes, V.**, Paradelo, R., and Monterroso, C., **Passivation techniques to prevent corrosion of iron sulphides in roofing slates**. Corrosion Science, 2009. 51 (10): p. 2387-2392.
25. **Cárdenes, V.**, García-Guinea, J., Monterroso, C., and de la Horra, R., **Protocol for assessing the effectiveness of protective coatings for roofing slate**. Materiales de Construcción, 2008. 58 (289-290): p. 263-279.
26. García-Guinea, J., **Cárdenes, V.**, Lombardero, M., and Desiloniz, M., *Determination of iron sulphides in roofing slates from the north west of Spain*. Materiales de Construcción, 2002. 52 (266): p. 55-63.
27. García-Guinea, J., **Cardenes, V.**, Martínez, A.T., and Martínez, M.J., *Fungal bioturbation paths in a compact disk*. Naturwissenschaften, 2001. 88 (8): p. 351-4.
28. García-Guinea, J., Sapalski, C., **Cardenes, V.**, and Lombardero, M., **Mineral inlays in natural stone slabs: techniques, materials and preservation**. Construction and Building Materials, 2000. 14 (6-7): p. 365-373.
29. García-Guinea, J., Cerezo, G., González-Martín, R., and **Cárdenes, V.**, *Iron Gallic Ink: Additives and photoinduced dehydration of the sulphate*. Afinidad, 2000. 489: p. 327-336.
30. García-Guinea, J., **Cárdenes, V.**, Correcher, V., Delgado, A., Lombardero, M., and Barros, J.C., *Dehydroxylation and Ostwald ripening effects in roofing slates*. Boletín de la Sociedad Española de Cerámica y Vidrio, 2000. 39 (4): p. 589-594.

Other publications

1. **Cárdenes, V.** and Santillán-Pedrosa, E., *Propuesta de actividad didáctica para el estudio del color, tamaño y composición de arenas de playa. Un caso práctico en la costa de Bélgica*. Revista de la Asociación Española para la enseñanza de las Ciencias de la Tierra, 2015. 23 (3): p. 315-319.
2. **Cárdenes, V.**, Paradelo, R., Rubio, A., and Monterroso, C., *Las minas de tungsteno de Valborraz: Descripción de un foco potencial de contaminación de arsénico*. Cuadernos do Laboratorio Xeolóxico de Laxe, 2013. 37: p. 147-162.
3. **Cárdenes, V.**, *La situación actual del sector de la pizarra*. Canteras y Explotaciones, 2013. 560: p. 18-22.
4. de la Horra, R., **Cárdenes, V.**, Pérez-Huerta, A., and González-Acebrón, L., *Primera descripción de niveles con glauconita en el Tramo de Transición, de edad Retiense (Triásico Superior), en el área de Caravia, Asturias, España*. Geotemas, 2012. 13: p. 103.
5. **Cárdenes, V.**, Rubio-Ordoñez, A., and Calleja, L., *Características macroscópicas y microscópicas de las pizarras para cubiertas de la Península Ibérica*. Geotemas, 2012. 13: p. 273.
6. **Cárdenes, V.**, Mateos, F.J., and Paradelo, R. *Disolución de rocas sedimentarias en función del sistema poroso*. in *VIII Congreso Geológico de España*. 2012. Oviedo.
7. **Cárdenes, V.**, *La pizarra española frente a la metalutita brasileña*. Roc Máquina, 2012 (131): p. 26-29.
8. Paradelo, R., **Cárdenes, V.**, and Barral, M.T., *Descrición da industria galega da lousa e do seu impacto ambiental*. Revista de la Real Academia Galega de Ciencias, 2011. 30: p. 65-90.

9. **Cárdenes, V.**, Rubio Ordoñez, A., López-Munguira, A., and Monterroso, C., *Petrografía y mineralogía de las pizarras para cubiertas de la Península Ibérica en relación con su calidad*. Trabajos de Geología, 2010. 30: p. 412-420.
10. **Cárdenes, V.**, Mateos, F., and Paradelo, R., *Emisiones de gases de efecto invernadero en la minería de áridos: análisis de una oportunidad de desarrollo*. Canteras y Explotaciones, 2010. 522: p. 52-55.
11. **Cárdenes, V.** and Rubio-Ordoñez, A., *Petrología de la pizarra para cubiertas y sus factores de calidad*. Tierra y Tecnología, 2008. 34: p. 91-96.
12. **Cárdenes, V.**, Lombardero, M., García-Guinea, J., and Pais, V., *Determinación de sulfuros de hierro en pizarras para cubiertas*. Roc Máquina, 2002. 77: p. 30-36.
13. García-Guinea, J., **Cárdenes, V.**, Martínez, M.J., and Martínez, A., *Un hongo que se come los CD*. Mundo Científico, 2001. 226: p. 72-73.
14. **Cárdenes, V.**, Lombardero, M., García-Guinea, J., and Barros, J.C., *Factores de calidad en la elaboración de placas de pizarra para cubiertas en Galicia y León*. Roc Máquina, 2001. 67: p. 90-98.

Books and Book chapters

1. **Cárdenes V.**, García-Guinea J. **Determinación del soporte pictórico pétreo en obras de Tiziano, Sebastiano del Piombo y Leandro Bassano**, in *In lapide Depictum Pintura italiana sobre piedra, 1530-1555*, González-Mozo A, Editor. 2018, Museo Nacional del Prado, Madrid. p. 52-5.
2. **Cárdenes, V.**, Merinero, R., López-Munguira, A., Rubio-Ordóñez, A., Pitcairn, I.K., and Cnudde, V., *Size evolution of micropyrite from diagenesis to low-grade metamorphism*, in *Metamorphic Geology: Microscale to Mountain Belts*, Ferrero, S., et al., Editors. 2018, Geological Society of London Special Publications Vol. 478: London.
3. **Cárdenes, V.**, Rubio, A., and Calleja, L., *Yacimientos y explotaciones de pizarra para cubiertas*, in *Itinerarios Geológicos por Asturias*, Bahamonde, J.R., et al., Editors. 2012, Sociedad Geológica de España: Oviedo. p. 57-73.
4. **Cárdenes, V.**, Rubio Ordoñez, A., and Calleja, L., eds. *Caracterización normativa de pizarras para cubiertas. Avances tecnológicos: el panel térmico solar. Depósito legal AS-03453-2011*. 2011: Oviedo. 978-84-615-1960-6
5. **Cárdenes, V.**, Pais, V., García-Guinea, J., and Gómez, F., *Pizarras de Techar*, in *Utilización de Rocas y Minerales Industriales*, García del Cura, M.A. and Cañaveras, C., Editors. 2006, Sociedad Española de Mineralogía: Alicante. p. 183-217.
6. García-Guinea, J., Correcher, V., Sánchez-Muñoz, L., and **Cárdenes, V.**, **Mosaicos de piedras tipo séctile: historia, técnicas, diseños, análisis y valoración**, in *Utilización de Rocas y Minerales Industriales*, García del Cura, M.A. and Cañaveras, C., Editors. 2006. p. 217-246.
7. Lombardero, M., Garcia-Guinea, J., and **Cárdenes, V.**, *The Geology of Roofing Slate*, in *Industrial Minerals and the Extractive Industry Geology*, Bristow, C. and Ganis, B., Editors. 2002, Geological Society Publishing House: Bath. p. 59-66.

Conference proceedings

1. **Cárdenes, V.** **Physical and petrographical characteristics of roofing slate lithotypes. in Global Stone Congress**. 2018. Ilheus, Brazil.
2. **Cárdenes, V.**, Mateos, F.J., Valdeon, L., and Rojo, A. **Piedramuelle Limestone in the building heritage of Oviedo, Spain, and adjacent towns**. in *EGU General Assembly 2017*. 2017. Vienna.
3. Morales Demarco, M. and **Cárdenes, V.** **Traditional application of slates in Uruguay**. in *EGU General Assembly 2017*. 2017. Vienna.

4. **Cárdenes, V.**, Merinero, R., López-Munguira, A., Rubio-Ordoñez, A., and Cnudde, V. *From shale to slate: using High Resolution X-Ray Tomography to determine the lower boundary of metamorphism in pelitic rocks.* in *35th International Geological Congress.* 2016. Cape Town.
5. **Cárdenes, V.** *Proposal of classification for roofing slates.* in *35th International Geological Congress.* 2016. Cape Town.
6. Merinero, R., Lunar, R., **Cárdenes, V.**, Somoza, L., and González, F.J. *Sunflower micro-pyrite in methane-derived carbonate pipes of the Gulf of Cadiz.* in *VIII Simposium on the Iberian Atlantic Margin.* 2015. Malaga.
7. **Cárdenes, V.**, Neupane, N.R., Paudel, L.P., Cnudde, V., and Cnudde, J.P. *Technological characterization of the roofing slate deposits in Nepal.* in *Seventh Nepal Geological Congress (NGC-VII).* 2015. Kathmandu: Nepal Geological Society.
8. **Cárdenes, V.**, Cnudde, V., Merinero, R., Dewanckele, J., de Boever, W., and Cnudde, J.P. *Determination of the REDOX paleoconditions: A High Resolution X-ray Tomography study of micro pyrite occurrence.* in *2nd International Conference on Tomography of Materials and Structures.* 2015. Quebec: INRS.
9. **Cárdenes, V.**, Cnudde, V., and Cnudde, J.P. *Petrography of roofing slate for quality assessment.* in *15th Euroseminar on Microscopy Applied to Building Materials.* 2015. Delft: Delft University of Technology.
10. **Cárdenes, V.**, Cnudde, V., and Cnudde, J.P. *Characteristic roofing slates from Spain: Morneau and Los Molinos.* in *EGU General Assembly 2014.* 2014. Wein.
11. **Cárdenes, V.**, Cnudde, V., De Boever, W., and Mateos, F. *Micro-CT and mercury intrusion porosimetry characterization of the fabric of roofing slate.* in *1st International Conference on Tomography of Materials and Structures.* 2013. Ghent.
12. **Cárdenes, V.**, Boever, W.D., Cnudde, J.P., and Cnudde, V. *Micro-CT study of the pathologies developed in roofing slate under acid attack.* in *14th Euroseminar on microscopy applied to building materials.* 2013. Helsingør.
13. Rubio-Ordoñez, A., **Cárdenes, V.**, Rodríguez-Terente, L., Tormo, L., and García-Guinea, J. *BSE, CL and Raman Spectroscopy study of phosphates and maskelenyte in the H6 Cangas de Onís regolith breccia.* in *CORALS-2011 Conference on the Micro-Raman and Luminescence in Earth and Space Sciences.* 2011. Madrid.
14. **Cárdenes, V.**, Mateos, F., and Paradelo, R. *Analysis of the correlations between freeze-thaw and salt crystallizations tests.* in *GEOREG. Forum de la Fédération Française des Géosciences. Géosciences des Régions de France et des pays environnants.* 2011. Villeneuve d'Ascq.
15. **Cárdenes, V.**, Rubio Ordoñez, A., Paradelo, R., and Monterroso, C. *Arsenic contamination in land affected by an abandoned tungsten mine in Galicia (NW Spain).* in *SEGH 2010 International Conference and Workshops. Environmental Quality and Human Health.* 2010. Galway.
16. Rivas, T., Iglesias, J., Cañas, I., **Cárdenes, V.**, and Taboada, J. *Oxidación de sulfuros en pizarra ornamental: tratamientos protectores con siloxanos.* in *Conferencia Internacional Minería Sostenible, 15, 16, 17 abril 2009.* 2009. Santiago de Compostela.
17. **Cárdenes, V.**, de la Horra, R., Monterroso, C., García-Guinea, J., and Pais, V. *Depósitos de pizarras para cubiertas en la Península Ibérica.* in *VII Congreso Geológico de España.* 2008. Las Palmas de Gran Canaria: Sociedad Geológica de España.
18. García-Guinea, J., Correcher, V., Sánchez-Muñoz, L., **Cárdenes, V.**, and Benavente, D. *Oxidación de pirita 001 inferida por DRX y termoluminiscencia.* in *XXVII Reunión de la Sociedad Española de Mineralogía.* 2007. Jaen: Sociedad Española de Mineralogía.
19. **Cárdenes, V.**, de la Horra, R., and Paradelo, R. *Pasivación de sulfuros de hierro en pizarras para cubiertas.* in *I Congreso Internacional Retos Medioambientales en el Sector de la Piedra Natural.* 2007. Cáceres.

20. García-Guinea, J., **Cárdenes, V.**, Correcher, V., Barrenechea, J.M., Lombardero, M., and Barros, J.C. *Reducción de la fisibilidad de la pizarra de techar por solarización: un estudio por termoluminiscencia y difracción de rayos X simultanea con radiación termal.* in *VI Reunión de Materiales.* 1999. San Sebastián: Sociedad Española de Materiales.

Patents

1. García-Guinea, J., **Cárdenes, V.**, Martínez, M.J., and Martínez, A.T., Modificación del sistema de fabricación de discos compactos para evitar su destrucción física por microorganismos. 2001.

Other

1. Member of the Scientific Committee of the International Federation for the Roofing Trade (IFD).
2. Extraordinary Doctorate Award, (2013). Universidad de Oviedo, Spain.
3. Scientific collaborator of the Geology Departments of Oviedo (Spain) and Ghent (Belgium) Universities.