Curriculum Vitae

Francesco S.R. Pausata

Personal and Contact Information

Place of birth: Udine, Italy
Emails: francesco.pausata@misu.su.se and pausata.francesco@uqam.ca
Web page: http:// www.pausata-climate.com/

Education

2007-2010 `Ph.D. in Geophysics`
University of Bergen (Norway)
University of Washington (USA) 01-2009 to 08-2009
Advisor: Kerim H. Nisancioglu (co-advisors: David S. Battisti, Camille Li, Justin W. Wettstein)
Dissertation: Past climate variability: model analysis and proxy intercomparison

2004-2006 `M.Sc. in Physics (Geophysics)`, *with highest honors*
University of Bologna (Italy)
Advisor: Rolando Rizzi
Thesis: Evaluation of radiative forcing and climate change during the XX and XXI centuries by means of AOGCM

2001-2004: `B.Sc. in Atmospheric Physics and Meteorology`, *with highest honors*
University of Bologna (Italy)
Advisor: Ennio Tosi
Thesis: Climate analysis of Friuli's mountain region

Professional Experience

2017-06 to date `Assistant Professor`
Department of Earth and Atmospheric Sciences, University of Quebec in Montreal, Montreal, QC, Canada

2016-08 to 2017-05 `Research Scientist`
Department of Meteorology, Stockholm University, Stockholm, Sweden
As an independent research program, I design and implement all aspects of my own agenda.

2014-01 to 2017-05 `Teaching Assistant`
Department of Meteorology, Stockholm University, Stockholm, Sweden

2016-05 to 2016-08 `Visiting Scientist`
Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, AB, Canada. Host scientists: Profs. Paul Myers and Andrew B.G. Bush

2014-2015 `Postdoctoral Researcher`
Department of Meteorology, Stockholm University, Stockholm Sweden
As an independent research program, I designed and implement all aspects of my own agenda.

2011-2013 `Postdoctoral Researcher`
European Commission - Joint Research Centre
Led efforts to examine the impacts of atmospheric circulation changes onto air-quality and how changes in anthropogenic aerosol emissions can impact atmospheric circulation.

2010 (Aug-Dec) `Research Fellow`
Geophysical Institute University of Bergen, Bergen, Norway
I continued my PhD research on interpreting proxy records using climate models.

2004-2007 `Laboratory Assistant`
University of Bologna, Italy

Laboratory assistant for two Biology courses: Laboratory of computational techniques and Laboratory of Physics. In the former, I taught how to use data analysis software for purposes linked to physics. In the latter, I helped setting up different kind of experiments.

2004-2006 Tutor in Atmospheric Physics
University of Bologna, Italy
Tutor in Atmospheric Physics: I was point of reference for bachelor students in Atmospheric Physics.

PUBLICATIONS

33 peer-reviewed articles in international scientific journals (of which 1 in Science, 1 in Science Advances, 2 in Nature Geoscience, 3 in Nature Communications and 3 in PNAS), 3 reports, and 5 other manuscripts under review. Total of *>1300 citations* and *h-index* of *16 and h-10 of 21 (Google Scholar)*.

Submitted

Griffiths, M.L., Johnson, K.R., Pausata, F.S.R., White, J.C., Henderson, G.M., Yang, H., Ersek, V., Conrad, C., and Sekhon N.: End of Green Sahara Responsible for Megadroughts and Cultural Shifts in Southeast Asia, *submitted*.

Winter, A., Zanchettin, D., Lachniet, M., Vieten, R., Ljunqqvist, F.C., Pausata, F.S.R., Miller, T., Rubino, A., Taricco, C., Rubinetti, S., and Cheng, H.: Abrupt onset of a persistent active Central American monsoonal regime at ~9,200 years BP, *under review*.

McGregor, S., Khodri, M., Maher, N., Ohba, M., Pausata, F.S.R., Stevenson, S.: The effect of strong volcanic eruptions on ENSO, book chapter, AGU books, *under review*.

Weldeab, S., Rühlemann, C., Bookhagen, B., Pausata, F.S.R., Perez-Lua, M.: Enhanced Himalayan glacial melting during YD and H1 recorded in the northern Bay of Bengal, G-Cubed, *under review*.

Sun, W., Wang, B., Zhang, Q., Pausata, F.S.R., Chen, D., Lu, G., Yan, M., Ning, L., and Liu, J.: Global land monsoon precipitation increased by the Green Sahara during mid-Holocene, Geophys. Res. Lett, *under review*.

Published

2019

36) Pausata, F.S.R and Camargo, S. J.: Tropical cyclone activity affected by volcanically induced ITCZ shifts, Proc. Natl. Acad. Sci., accepted.

2018

35) Messori, G., Gaetani, M., Zhang, Q., Zhang, Q., Pausata, F.S.R.: The Water Cycle of the Mid-Holocene West African Monsoon: the Role of Vegetation and Dust Emission Changes, Int. J. Clim., 2018.

34) Messori, G., Davini, P., Alvarez-Castro, C.M., Pausata, F.S.R., Caballero, and R., Yiou, P.: On the low-frequency variability of wintertime Euro-Atlantic planetary wave-breaking, Clim. Dyn., 1-20, 2018.

33) Messori, G., van Wees, D., Pausata, F.S.R., Acosta Navarro, J.C., Hannachi, A., and Dentener, F.J.: Future atmospheric circulation changes over the Euro-Atlantic sector and impacts on urban PM2.5 concentrations, Tellus-B, 2018.

2017

32) Otto-Bliesner, B., Braconnot, P., Harrison, S., Lunt, D., Abe-Ouchi, A., Albani, S., Bartlein, P., Capron, E., Carlson, A., Dutton, A., Fischer, H., Goelzer, H., Govin, A., Haywood, A., Joos, F., LeGrande, A.N., Lipscomb, W., Lohmann, G., Mahowald, N., Nehrbass-Ahles, C., Peterschmidt, J.-Y., Pausata, F.S.R., Phipps, S., and Renssen, H.: Two Interglacials: Scientific Objectives and

Experimental Designs for CMIP6 and PMIP4 Holocene and Last Interglacial Simulations, Geosci. Model Dev., 10, 3979-4003, 2017. *Citations: 11*

31) Muschitiello, F., Pausata, F.S.R., Lea, J.M., Mairand, D.W.F. and Wohlfarth, B.: Enhanced ice sheet melting driven by volcanic eruptions during the last deglaciation, Nature Commun., 1020, 2017. *Citations: 4*

30) Zanchettin, D., Pausata, F.S.R., Khodri, M., Timmreck, C., Graf, H., Jungclaus, J.H., Robock, A., Rubino, A., and Thompson, V.: Toward predicting volcanically-forced decadal climate variability, Past Global Changes Magazine, 25, 1, CLIVAR Exchanges, 72, 2017.

29) Gaetani, M., Messori, G., Zhang, Q., Flamant, C., and Pausata, F.S.R.: Understanding the mechanisms behind the West African Monsoon strength in the Mid-Holocene, J. Clim., 2017. *Citations: 3*

28) Maldonado, T., Rutgersson, A., Caballero, R., Pausata, F.S.R., Alfaro, E. and Amador, J.: The Role of the Meridional Sea surface Temperature Gradient in modelling the Caribbean low-level jet, J. Geophys. Res., 2017. *Citations: 1*

27) Pausata F.S.R., Zhang, Q., Muschitiello, F., Lu, Z., Chafik, L., Niedermeyer, E.M., Stager, J.C., Cobb, K.M., and Liu, Z.: Green Sahara suppressing ENSO activity during the Mid-Holocene, Nature Commun., 8, 2017. *Citations: 6*

26) Pausata, F.S.R., Emanuel, K., Chiacchio, M., Diro, G., Zhang, Q., Sushama, L., Stager, J.C., and Donnelly, J.: Tropical storm activity enhanced by Sahara greening and reduced dust emissions during the African Humid Period, Proc. Natl. Acad. Sci., 2017. *Citations: 5*

25) Acosta Navarro, J.C., Ekman, A.M.L., Pausata, F.S.R., Lewinschal, A., Varma, V., Seland, Ø., Gauss, M., Iversen, T., Kirkevag, A., Riipinen, I., and Hansson, H.C.: Future response of temperature and precipitation to reduced aerosol emissions as compared with increased greenhouse gas concentrations, J. Clim., 30, 940-954, 2017. *Citations: 11*

24) Chiacchio, M., Pausata, F.S.R., Messori, G., Hannachi, A., Chin, M., Önskog, T., Liepert, B., Ekman, A., and Barrie, L.: On the links between meteorological variables, aerosols and global tropical cyclone frequency, J. Geophys. Res., 2017. *Citations: 3*

23) Tierney, J.E., Pausata, F.S.R., and deMenocal, P.B.: Rainfall regimes of the Green Sahara, Science Advances, 3, 1, 2017. *Citations: 26*

2016

22) Pausata, F.S.R., Lindvall, J., Ekman, A.M., and Svensson, G.: Climate effects of a potential regional nuclear war: Sensitivity to emissions, duration and particle composition, Earth's Future, 4, 2016. *Citations: 2*

21) Pausata, F.S.R, Karamperidou, C., Caballero, R., and Battisti, D.S.: ENSO response to high-latitude volcanic eruptions in the Northern Hemisphere: The role of the initial conditions, Geophys. Res. Lett., 43 (16), 8694-8702, 2016. *Citations: 20*

20) Zanchettin, D., Khodri, M., Timmreck, C., Toohey, M., Schmidt, A., Gerber, E.P., Hegerl, G., Robock, A., Pausata, F.S.R., Ball, W., Bauer, S.E., Bekki, S., Dhomse, S.S., LeGrande, A.N., Mann, G.W., Marshall, L., Mills, M., Marchand, M., Niemeier, U., Poulain, V., Rubino, A., Stenke, A., Tsigaridis, K., and Tummon, F.: The Model Intercomparison Project on the climatic response to Volcanic forcing (VolMIP): Experimental design and forcing input data, Geosci. Model Dev., 9, 2701-2719, 2016. *Citations: 35*

19) Salih, A.A.M., Zhang Q., Pausata, F.S.R., and Tjernström, M: Sources of Sahelian Sudan moisture: insights from a moisture-tracing atmospheric model, J. Geophys. Res., 121 (13), 7819–7832, 2016. *Citations: 4*

18) Pausata, F.S.R., LeGrande, A.N., and Roberts, W.H.G.: How Will Sea Ice Loss Affect the

Greenland Ice Sheet?, Eos, 97, 2016.

17) Pausata, F.S.R., Messori, G., and Zhang, Q.: Impacts of Dust Reduction on the Northward Expansion of the African Monsoon During the Green Sahara Period, Earth Plan. Sci. Lett., 434, 298–307, 2016. *Citations: 28*

16) Tierney, J.E., Pausata, F.S.R., and deMenocal, P.B.: Deglacial evolution of the Arabian Sea and the impact on the Indian monsoon, Nature Geosci., 9, 46-50, 2016. *Citations: 20*

2015

15) Pausata, F.S.R., and Löfverström, M.: On the enigmatic similarity in Greenland $\delta^{18}O$ between the Oldest and Younger Dryas, Geophys. Res. Lett., 42 (23), 10470-10477, 2015. *Citations: 9*

14) Muschitiello, F., Pausata, F.S.R., Watson, J. E., Smittenberg, R. H., Salih, A. A. M., Brooks, S. J., Whitehouse, N. J., Karlatou-Charalampopoulou, A., Wohlfarth, B.: Fennoscandian freshwater control on Greenland hydrologic shifts at the onset of the Younger Dryas, Nature Commun., 6, 8939, 2015. *Citations: 22*

13) Pausata, F.S.R., Chafik, L., Caballero R. and Battisti, D.S.: High-latitude eruption impacts on ENSO and AMOC, Proc. Natl. Acad. Sci., 112 (45), 13784-13788, 2015. Citations: 45

12) Jasechko, S., Lechler, A., Pausata, F.S.R., Fawcett, P.J.F., Gleeson, T.G, Cendón, D.I.C., Galewsky, J.G., LeGrande, A.N.L., Risi, C.R., Sharp, Z.D.S., Welker, J.M.W, Werner, M.W., Yoshimura K.Y.: Glacial-interglacial shifts in global and regional precipitation $\delta^{18}O$, Clim. Past., 11, 1375-1393, 2015. *Citations: 24*

11) Pausata, F.S.R., Grini, A., Caballero, R., Hannachi, A., Seland, Ø.: High-latitude volcanic eruption in the Norwegian Earth System Model: the effect of different initial conditions and of the ensemble size, Tellus-B, 67, 26728, 2015. *Citations: 17*

10) Pausata, F.S.R.: How do high-latitude volcanic eruptions affect climate?, Eos, 96, 2015. *Citations: 1*

9) Pausata, F.S.R., Gaetani, M., Messori, G., Kloster, S., Dentener, F.J.: The role of aerosol in altering North Atlantic winter atmospheric circulation and its impact on air quality, Atmos. Chem. Phys., 15, 1725-1743, 2015. *Citations: 12*

2012-2013

8) Pausata, F.S.R., Pozzoli, L., Van Dingenen, R., Vignati, E., Cavalli, F., Dentener, F.J.: Impacts of changes in North Atlantic atmospheric circulation on particulate matter and human health in Europe, Geophys. Res. Lett., 40 (15), 4074–4080, 2013. *Citations: 13*

7) Pausata, F.S.R., Pozzoli, L, Vignati, E., Dentener, F.J.: North Atlantic Oscillation and tropospheric ozone variability in Europe: model analysis and measurements intercomparison, Atmos. Chem. Phiys., 12, 6357–6376, 2012. *Citations: 32*

6) Berkelhammer, M., Sinha, A., Stott, L., Cheng, H., Pausata, F.S.R., Yoshimura, K.: An abrupt shift in the Indian Monsoon 4,000 years ago, in Climates, Landscapes, and Civilizations, Geophys. Monogr. Ser., AGU, 198, 75–87, 2012. *Citations: 105*

2009-2011

5) Pausata, F.S.R., Li, C., Wettstein, J.J., Nisancioglu, K.H., Kageyama, M.: The key role of topography in altering North Atlantic atmospheric circulation during the last glacial period. Clim. Past, 7, 1–13, 2011. *Citations: 84*

4) Pausata, F.S.R., Battisti, D.S., Nisancioglu, K.H., Bitz C.M.: Chinese stalagmite $\delta^{18}O$ controlled by changes in the Indian monsoon during a simulated Heinrich event. Nature Geosci., 4, 474–480, 2011. *Citations: 325*

3) Stager, J.C., Ryves, D., Chase, B., Pausata, F.S.R.: Catastrophic drought in the Afro-Asian monsoon regions during Heirinch Stadial 1. Science, 331, 1299-1302, 2011. *Citations: 145*

2) Andersson, C., Pausata, F.S.R., Jansen, E., Risebrobakken, B., and Telford, R.J.: Holocene trends in the foraminifer record from the Norwegian Sea and the North Atlantic Ocean, Clim. Past, 6, 179–193, 2010. *Citations: 85*

1) Pausata, F.S.R., Li, C., Wettstein, J.J., Nisancioglu, K.H., and Battisti, D.S.: Changes in atmospheric variability in a glacial climate and the impacts on proxy data: a model intercomparison, Clim. Past, 5, 489–502, 2019. *Citations: 28*

Pausata, F.S.R.: Analisi climatica della montagna friulana, In Alto, CXXIV, SAF- CAI, 2006 (Bsc. Thesis).
Contribution to the book: "Guida Pratica al Meteo per l'Escursionista" by M. Virgilio, Editrice Co.El.

Grants and Fellowship

- NSERC discovery grant: PI for the project DiViCLIM (Dust Impact and Vegetation Influence on CLIMate: looking to the future from a paleo perspective) CA$ 150 k.
- FRQSC team grant: co-PI for the project "Hominin dispersals research group". Total grant awarded CA$ 300 k.
- Grant from the Faculty of Science and the Department of Earth and Atmospheric Science at the University of Quebec in Montreal CA$ ~27.5 k.
- Partner PI (Sweden partnership) in the project PACMEDY (PAlaeo-Constraints on Monsoon Evolution and Dynamics) involving 17 institutions from 7 different countries. Period 2016-2019. Total grant awarded: CA$ ~4.0 m; Swedish partnership: CA$ ~300 k (Funding agency BELMONT FORUM).
- Grant to support a 4-month research on impacts of nuclear war emissions for the supervision of a post-doctoral fellow (August-November 2014) from the Swedish association of medical doctors against nuclear weapons. (CA$ ~50 k)
- Grants to organize workshops:
  - Paleoclimate workshop October 20th-22nd 2014: Understanding the processes behind isotope signals in paleoclimate archives, together with modern satellite measurements and atmospheric modeling. Funds granted by the Bolin Center for Climate Research.
  - Volcanic eruptions workshop November 5th-7th 2014: High-latitude volcanic eruption and climate: filling the gaps. The outcome and modeling strategy, which were defined during this workshop was an important contribution and highly relevant for the volcanic forcing (VolMIP) initiative. Funds granted by International Meteorological Institute.
- Università degli Studi di Bologna ARSTUD Scholarship from 2001 to 2006.

Invited seminars / Lectures / scientific stays

09/2019 plenary talk at 13th International Conference of Paleoceanography, Sidney, Australia. ICP Organizing Committee.

09/2018 Overview presentation at LandCover6ka Working Group Sitges, Spain. LC6ka Organizing Committee.
09/2018 at University of Melbourne, Melbourne, Australia. Organizer: Prof. David Phillips.
07/2018 at University of Sao Paulo, Sao Paulo, Brazil. Organizer: Prof. Pedro Diaz.

06/2018 at Centro EuroMediteranneo per i Cambiamenti Climatici, Bologna, Italy. Organizer: Dr. Silvio Gualdi.

06/2018 at Stockholm University, Stockholm, Sweden. Organizer: Prof. Rodrigo Caballero.

02/2018 at Yale University, New Haven, CT, USA. Organizer: Prof. Alexey Federov.

01/2018 at Stockholm University, Stockholm, Sweden. Organizer: Prof. Jonas Nycander.

02/2017 at Georgia Institute of Technology, Atlanta, GA, USA. Organizer: Prof. Jean Lynch-Stieglitz.

11/2016 at Université du Québec à Montréal, Montreal, Canada. Organizer: Prof. Gilles Couture.

10/2016 at Laboratoire Atmosphères, Milieux, Observations Spatiales, Paris, France. Organizer: Dr. Cyrille Flamant.

06/2016 at Massachusetts Institute of Technology, MA, USA. Organizer: Prof. David McGee.

05/2016 at Wood Hole Oceanographic Institution, MA, USA. Organizer: Prof. Sarah B. Das.

02/2016 at University of Alberta, Edmonton, Canada. Organizer: Prof. Paul Myers.

02/2016 at Lamont Doherty Earth Observatory of Columbia University, NY, USA. Organizers: Profs. Peter deMenocal, Alessandra Giannini and Katia Fernandes.

02/2016 at Yale University, New Haven, CT, USA. Organizer: Prof. Alexey Federov.

10/2015 at the Ice2ice workshop (*On the puzzling features of Greenland ice-core isotopic composition*) held in Copenhagen 26-28th October 2015.

08/2015 at Bolin Centre Summer School on Isotopes Climate and the Earth System 23-29 August 2015 Islay - Scotland (UK)

05/2015 at Université du Québec à Montréal, Montreal, Canada. Organizer: Prof. Laxmi Sushama.

05/2015 at McGill University, Montreal, Canada. Organizers: Profs. John R. Gyakum and Lawrence Mysak.

09/2014 at the "Exploratory workshops on faunal history and exploitation of seals in Northern Europe - Consequences of past climate change on evolutionary dynamics in Arctic species". Archeology department, Stockholm University. Organizers: Dr. Aikaterini Glykou, Dr. Jan Storå, Prof. Kerstin Lidén.

03/2014 at Geophysical Institute, University of Bergen, Norway. Organizer: Prof. Kerim H. Nisancioglu.

06/2013 at Finnish Meteorological Institute. Organizer: Prof. Ari Laaksonen.

06/2013 at MISU, University of Stockholm, Sweden. Organizer: Prof. Rodrigo Caballero.

10/2012 at Meteorological Institute, Oslo, Norway. Organizer: Dr. habil. Michael Schulz.

09/2011 at Geophysical Institute, University of Bergen, Norway. Organizer: Dr. Anders Sirevaag.

06/2010 at School of Geography, Politics & Sociology, University of Newcastle, England. Organizer: Dr. Stephen Juggins.

Supervision

Currently supervising two master students (Samuel Dandoy and Alain Dominic) at UQAM and co-supervising Emma Härenstam at Stockholm University.

Co-supervised a master student (Dave van Wees), Sept. 2015-June 2016.

Honors and Awards

- European Geoscience Union (EGU) complimentary membership for 2011 for the EGU-related activities performed.
- The paper "Impacts of changes in North Atlantic atmospheric circulation on particulate matter and human health in Europe" has been selected as an AGU "Research Spotlight" and to feature in

Wiley's *News Round-Up*.

- The paper "Chinese stalagmite $\delta^{18}O$ controlled by changes in the Indian monsoon during a simulated Heinrich event" has been selected as Editor Choice feature by Science (1 July 2011 issue).

Academic service

- Academic Editor for the journal PlosOne.
- Chair of the Ocean Science III session at the AGU Joint Assembly meeting in Montreal, May 2015.
- Reviewer of manuscripts for Nature, Nature Geosci., Nature Comm., Science Advs., Atmos. Chem. Phys., Geology, Quat. Sci. Rev., Earth Planet. Sci. Lett., J. Clim., Geophys. Res. Lett., J. Geophys. Res., Clim. Past..
- Reviewer for a National Science Foundation – USA proposal in 2016.
- Organizer or co-organizer of the following workshop:
  - *On the puzzling features of Greenland ice-core isotopic composition*; Copenhagen, Denmark 26-28 October 2015.
  - *High-Latitude Volcanic Eruption Impacts on Climate*: *Filling the Gaps*; Stockholm, Sweden, 5–7 November 2014.
  - *Stable water isotopes and climate*; Stockholm, Sweden, 20–22 October 2014.
- Member of the jury evaluating the PhD thesis of Gemechu Fanta Garuma (May 2019)
- Member of the jury evaluating the PhD thesis of Ignacio Hermoso de Mendoza Naval (February 2019)
- Member of the jury evaluating the Licentiate* thesis of Yamoah Kweku Kyei Afrifa's (Reconstruction of the Southeast Asian hydro-climate using biomarkers and their hydrogen isotopic composition) at Stockholm University (12/01/2015).

**Licentiate is a degree between master and PhD in the Swedish Universities*

Outreach Activities

02/2019 Interviewed by
01/2019 Interviewed by Correiro Braziliense
https://www.correiobraziliense.com.br/app/noticia/ciencia-e-saude/2019/01/16/interna_ciencia_saude,731082/saara-muda-a-cada-20-mil-anos-aponta-estudo-americano.shtml
03/2017 Interviewed by BBC Mundo:
http://www.periodistadigital.com/ciencia/medioambiente/2017/03/24/asi-era-el-sahara-antes-de-convertirse-en-el-mayor-desierto-del-mundo.shtml (in Spanish)
03/2017 Interviewed by Swedish national radio (Vetenskapsradion - radio science): http://sverigesradio.se/sida/artikel.aspx?programid=415&artikel=6649269 (from minute 33 and 30 seconds) And a short news:

http://sverigesradio.se/sida/artikel.aspx?programid=406&artikel=6648718 (in Swedish)

07/2015 Messori, G. and Pausata, F.S.R. "Gabriele e Francesco, alla conquista della meteorologia scandinava". Nimbus (*http://www.nimbus.it/meteoshop/VediLibro.asp?IdArticolo=786&IdPag=1*)

05/2010 Seminar about climate change for an elementary school (4th and 5th grade)

03/2010 Weather reporter for an USA web-news: http://www.komonews.com/weather/blog/86291382.html

02/2009 Science Night at Echo Lake Elementary School in Shoreline (Seattle, WA)

01/2009 Invited guest for the TV-program "METEO WEEKEND", Telefriuli (local Italian TV channel). Topic: Global Warming and Arctic Sea Ice retreat. Links:

http://www.youtube.com/watch?v=bTSEqP2PD8c (part I)

http://www.youtube.com/watch?v=3i1B0QJTlfQ&feature=related (part II)

2005-2006 "Open Laboratory" for high-school students

2005 Organizing Committee for the World Year of Physics at the University of Bologna

LANGUAGE KNOWLEDGE

Mother tongue	Italian			
	Speaking	Listening	Writing	Reading
English	Superior/Fluent	Superior/Fluent	Superior/Fluent	Superior/Fluent
Portuguese	Superior/Fluent	Superior/Fluent	Advanced (low)	Superior/Fluent
French	Intermediate (mid)	Advanced (low)	Intermediate (low)	Advanced (high)
Spanish	Intermediate (mid)	Intermediate (high)	Intermediate (low)	Advanced (low)
Norwegian/ Swedish	Novice (high)	Novice (high)	Novice (high)	Novice (high)