

Summary of Phd (4000)

My PhD was carried out jointly at the University of Birmingham (UK) and at the University of Melbourne (Australia). During that time, I also established scientific collaborations with the Met Office, European Centre for Medium-Range Weather Forecasts (ECMWF) and the natural hazard risk model development department of CoreLogic. These collaborations have led to 3 publications and 2 more will soon be submitted.

For my thesis, I investigated atmospheric and oceanic conditions important for the development of severe extra-tropical cyclones (ETCs) and their associated windstorms, which are the single most costly natural hazard in several European countries and for Europe as a whole, on the synoptic (several days) and seasonal time scales.

In particular, I was the first person to compare the relative importance of different atmospheric conditions at the synoptic time scale (e.g. baroclinicity, lower level latent heat release and upper tropospheric divergence) between low-impact ETCs and high-impact systems with associated windstorm. I found that normalised growth conditions were one standard deviation greater, on average, for ETCs with windstorms compared to average ETCs. The results also highlighted the importance of the location of the growth condition anomaly with respect to the position and path of the cyclone: I showed that in some cases, availability of latent heat is not sufficient but must be 'accessible' to contribute to the strengthening of an ETC.

Further analyses on the synoptic scale show a systematic relation between geopotential (Rossby) waves and the occurrence of strong wind events. While there have been many studies about the link between Rossby wave amplitudes and climate extremes, this had not been systematically investigated for strong wind events. Results differ for different zonal wave numbers, and in case of planetary wave number 3 the relation of amplitude to strong wind events could be shown to be non-linear.

At the seasonal scale, I investigated large-scale drivers of ETCs and windstorms, in particular the role of North Atlantic sea surface temperature (SST). SST are known to provide a source of seasonal predictability in late summer in the form of a horseshoe-like pattern (NAH) for the phase of the North Atlantic Oscillation (NAO) and thus extra-tropical cyclone activity in the subsequent winter. I could show that the summer signal of the SST in the North Atlantic is still present in synoptic scale growth factors about 4 months later in early winter. AMIP-type sensitivity experiments using the ECHAM5 showed that part of the signal is transported via the troposphere. The NAH influences the meridional temperature gradient and thus baroclinicity and the position and strength of the eddy driven jet which in turn has an influence on ETC activity. This work has already contributed to improving risk transfer models in the insurance sector: North Atlantic SSTs and their statistical relation to large scale teleconnection patterns are considered when estimating the potential impact of a storm season. I further identified a potential low-frequency modulation between the link of NAH and NAO and NAH and windstorms respectively. The relation between windstorm frequency and NAO remains similar over the investigated period (~last 40 years), but while the NAH and the NAO are highly correlated in the 1980s and 1990s, this link disappears unexpectedly in the early 2000s. What is behind this breakdown will be the main focus of the proposed project.

Throughout my PhD, I also worked as a research associate (see next section) and for the insurance industry (see section after that).

Summary of previous post-doc work (if applicable, 3000)

I have 29 months experience as a research associate. All but one of the research associate projects were designed as post-doc positions. The research for all of these positions was performed at the University of Birmingham (UK).

Related to my PhD research, I have been involved in two projects (in total 15 months) investigating the skill of seasonal windstorm frequency and sources of seasonal windstorm predictability. In collaboration with the ECMWF and the Met Office, I investigated the potential usefulness and limitations of state-of-the-art seasonal forecast systems with respect to prediction skill for ETCs and European windstorms. The investigated models from the ECMWF and the Met Office show good agreement of spatial climatological distributions of ETCs and windstorms in comparison with reanalysis data (ERA-Interim). There are however both positive and negative biases present depending on the model and region analysed. All seasonal prediction systems show widely small to moderate positive skill in forecasting the winter season frequency of ETCs and windstorms over the Northern Hemisphere. The skill is highest for ETCs at the downstream end of the Pacific stormtrack and for windstorms at the downstream end of the Atlantic stormtrack. Results of this study (currently under review) will be far from marginal academic interests as we find significant skill for high impact windstorms affecting several densely populated European regions.

In another research associate position I investigated the physical reasons and statistical relations behind different types of clustering of extra-tropical cyclones and windstorms. Storms clusters can produce great amount of losses and are therefore especially interesting for the insurance industry. We identified the most dominant variability mode responsible for clustering over different European regions. Our results further suggest that the likelihood of clustering of windstorms increases throughout the winter season.

I was further involved in a UK research council funded local knowledge transfer project providing scientific advice to a crop production system developer in Birmingham (Saturn Bioponics, <http://www.saturnbioponics.com/>). We investigated the feasibility, from a meteorological perspective, to grow greenhouse plants, such as lettuce, in a vertical direction.

In my first position as research associate funded by the UK Natural Environment Research Council, I investigated the spatial structure and potential predictability of precipitation in Ethiopia at the seasonal time scale.

Summary of previous Industrial sector experience as postdoc or technician work (if applicable,3000)

My whole research career was in close contact with the (re) insurance industry. Projects I was involved with were funded by CoreLogic (<https://www.corelogic.com/products/european-windstorm-model.aspx>, or as their previous name EQECAT) and RPI (Risk Prediction Initiative, <http://rpi.bios.edu/research/european-storms>) and GdV (German Insurance Association, <https://www.gdv.de/en>).

I joined Risk Management Solutions (RMS, <http://www.rms.com/>) in London for 3.5 months as an intern in 2013.

RMS is the world-leading catastrophe risk modelling company. Besides giving three 1-hour long presentations about my and general ongoing windstorm research I worked as part of the medium term hurricane risk team. My main task was to include CMIP5 climate model data in existing

hurricane loss models. I also investigated the differences in skill of various hurricane models (from very simple to complex) and improved the efficiency of the model computation.

During my most recent position, I visited the risk modelling team of CoreLogic in Paris on several occasions to explain recent advances in windstorm research and, in particular, identify how the output of my research and that of my team at the University of Birmingham could lead to potential improvement in their windstorm model.

Career breaks (3000)

I did not work either as doctoral researcher or research associate from May to July 2017 and only worked part-time (50%) from August 2017 to March 2018. This was due to the birth of my daughter.

Research Experience (4000)

I received my MSc degree in July 2012 that entitled me to start a PhD programme according to German regulations. My research experience combining my current and my previous positions as research associate, doctoral researcher and visiting academic add up to 6 years and 1.5 months of full time research.

I have continuously held a research position either as research associate or PhD student since September 2012, with the exception of parental leave (see career breaks). I carried out my PhD related research during the undeclared periods in the list below.

Since Apr 2018

Post-Doc Position at the Barcelona Supercomputing Center in the Climate Prediction Group of the Earth Science Department

Main Task: Production of EC Earth model simulations as part of the BSC contribution to the Decadal Climate Prediction Project (DCPP) of the World Climate Research Programme (WCRP) / Construction of probability forecasts of decadal predictions up to 10 years ahead as part of the H2020-EUCP (European Climate Prediction) Project.

Jul 2017- Mar 2018

Research Associate (part-time, 50%) at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

Collaboration with CoreLogic (Risk Model Development Division, Paris)

Main Task: Assessment of sources of seasonal windstorm predictability

Data and Methods (=D&M): Multi-Member Seasonal Forecast Models, GCM-Data, Reanalysis Composite- and Time Series Analysis, Evaluation of GCM Sensitivity Experiments

Jan - Apr 2017

Research Associate at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

Collaboration with Risk Prediction Initiative, Bermuda

Main Task: Analysis of windstorm clustering

Used Data & Methods (=D&M): Reanalysis / Correlation-Analysis, Regression Model

Mar - Oct 2016

Research Associate at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

EU-FP7-CIG: Extreme Events Variability over Europe

Main Task: Analysis of seasonal forecast skill for extra-tropical cyclones and windstorms

D&M: Multi-Member-Seasonal Forecast Models, Reanalysis / Skill Scores, Correlation Analysis, Regression Model

Feb - Jun 2015

Research Associate

at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

UoB Business-Knowledge Innovation Activity (Collaboration with Bioponics, Birmingham)

Main Task: Comparison of worldwide meteorological conditions suitable for greenhouse plants

D&M: Reanalysis, RCM-Data / Bias – Correction, Regression Model, Climate Indices

Jul - Oct 2013

Internship

at Risk Management Solutions, London, UK, in the department: Model Development

Main Task: Implementation of CMIP5 data in hurricane loss models

D&M: CMIP5 Models, Observations / Statistical Prediction Models, Forecast Verification

May - Jun 2012

Visiting Academic

at the Climate Change Research Centre, University of New South Wales, Sydney, Australia

Main Task: Comparison of extreme indices in different data sets

D&M: Gridded Observations, Reanalyses / Climate Extreme Indices, Time Series Analysis

Nov 2011 - Apr 2012

Research Associate

at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

Main Task: Comparison of climate model data to speleothem isotope observations

D&M: Reanalyses, GCM-Data, Observations / Statistical Downscaling, PCA, Regression Model

Aug 2007 - Aug 2011

Student Assistant (10 hours a week)

at the Institute of Meteorology at Freie University of Berlin, Germany

Main Task: Analyses of windstorm loss potentials in global and regional climate models

D&M: GCM-, RCM Data, Reanalyses, Loss Data, Observations / Application of Loss Model, Time Series Analysis, Regression Model, Multi-Model-Combinatorics

Education (4000)

Sep 2012 – Mar 2018

Doctoral Researcher at the School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

Supervision: Gregor Leckebusch

Thesis Title: North Atlantic Winter Windstorm Variability across different Time Scales

I paused my PhD 4 times for several months to either work as a research associate or in the insurance industry (see previous sections). The actual PhD study period was 3 years and 8 months.

Nov - Dec 2014

Visit at the School of Earth Sciences, University of Melbourne, Australia

Apr 2009 - Jul 2012

Graduate Studies at the Institute of Meteorology, Freie Universitaet Berlin, Germany

Master of Science in Meteorology with average mark: 1.7 *

Master Thesis: South Asian Monsoon Variability and its Relation to Mid-Latitude Teleconnections

Supervision: Ulrich Cubasch, Gregor Leckebusch

Oct 2005 - Mar 2009

Undergraduate Studies at the Institute of Meteorology, Freie Universitaet Berlin, Germany

Bachelor of Science in Meteorology with average mark: 2.1 *

Bachelor Thesis: Wind Spectra in RCMs in Comparison to the Driving Large-Scale Model

Supervision: Gregor Leckebusch, Uwe Ulbrich

Oct 1995 - Jun 2004

Grammar School, Heinrich - Heine - Gymnasium, Munich, Germany

Abitur (general qualification for university entrance) with average mark: 2.1 *

* German marking system is linear from 1.0 (best) to 4.0 (adequate)

Publications (4000)

I have an h-index of 5 and an i10-index of 5. According to Scopus the published articles below have in total 168 citations in 151 documents. According to Google Scholar the publications have 256 citations. 3 out of my 6 publications are in the Top-5 journals of their respective categories, 5 publications are in the upper quartile.

**** Published ****

-A: Befort, DJ, S Wild, T Kruschke, U Ulbrich, GC Leckebusch. 2016:

Different Long-term Trends of Extra-tropical Cyclones and Windstorms in ERA-20C and NOAA-20CR Reanalyses

Atmospheric Science Letters. Vol (17). 586–595.

(Scopus Cite Score: 1.8, Scopus Cite Score Rank: 43/95)

-A: Wild, S, DJ Befort, GC Leckebusch. 2015:

Was the Extreme Storm Season in Winter 2013/14 Over the North Atlantic and the United Kingdom Triggered by Changes in the West Pacific Warm Pool?

Bulletin of the American Meteorological Society. Vol 96 (12). S29–S34.

(Scopus Cite Score: 7.0, Scopus Cite Score Rank: 1/95)

-A: Donat, MG, J Sillmann, S Wild, LV Alexander, T Lippmann, F Zwiers. 2014:

Comparison of extreme temperature and precipitation in an ensemble of global observational and reanalyses data

Journal of Climate. Vol 27 (13). 5019-5035.

(Scopus Cite Score: 5.1, Scopus Cite Score Rank: 3/95)

-A: Donat, MG, D Renggli, S Wild, LV Alexander, GC Leckebusch, U Ulbrich. 2011:

Reanalysis suggests long term upward trends in European - storminess since 1871

Geophysical Research Letters. Vol 38. L14703.

(Scopus Cite Score: 4.4, Scopus Cite Score Rank: 4/98)

-A: Donat, MG, GC Leckebusch, S Wild, U Ulbrich. 2011:
Future changes of European winter storm losses and extreme wind speeds
implied from outputs of multi-model GCM and RCM simulations.
Natural Hazards and Earth System Sciences. Vol 11 (5). 1351-1370. DOI:10.5194/nhess-11-1351-
2011

(Scopus Cite Score: 2.7, Scopus Cite Score Rank: 18/169)

-A: Donat, MG, GC Leckebusch, S Wild, U Ulbrich. 2010:
Benefits and limitations of regional multi-model ensembles for storm loss estimations.
Climate Research. Vol 44 (2-3). 211-225.

(Scopus Cite Score: 1.8, Scopus Cite Score Rank: 44/185)

** Submitted **

-A: Befort, DJ, S Wild, A Weisheimer, JR Knight, HE Thornton, JF Lockwood, PE Bett, L
Hermanson, GC Leckebusch. 2018:

Extra-tropical Cyclones and Windstorms in Seasonal Prediction Models
submitted to Quarterly Journal of the Royal Meteorological Society

(Scopus Cite Score: 3.3, Scopus Cite Score Rank: 17/95)

** To be submitted in 2018 **

-A: Wild, S, I Simmonds, GC Leckebusch.

Tropospheric Mid-latitude Geopotential Wave Characteristics associated with Strong Wind Events
in the North Atlantic/European Region

-A: Wild, S, DJ Befort, GC Leckebusch.

Drivers of Seasonal Variability and Potential Predictability for Winter Storms over Europe

-A: GC Leckebusch, DJ Befort, S Wild.

The Northern Hemispheric Circumpolar Vortex under Climate Change

-A: N Kirchner-Bossi, DJ Befort, S Wild, GC Leckebusch.

Serial Clustering of Extra-tropical Cyclones and Windstorms over Europe

-A: G Mamadjanova, S Wild, MA Walz, GC Leckebusch.

Statistical Characteristics of Mudflows in the Piedmont Areas of Uzbekistan and the Role of
Synoptic Processes for their Formation

Invited Presentations (2000)

- Dec 2017, BSC, Barcelona: Skill in Seasonal Prediction Models and Drivers of Seasonal
Variability of Extra-tropical Cyclones and Windstorms

- Dec 2014, Climate Change Research Center, University of New South Wales, Sydney, Australia:
From Extra-tropical Cyclone to Windstorms

- June 2013, Risk Management Solutions, London: Combining benefits from different
methodologies of analysing large-scale influences for an improved understanding of extreme event
occurrence

- 2016-2018, CoreLogic Paris: Several presentation about ongoing research

Participation in Meetings and Conferences (3000)

I had a total of 37 contributions to international conferences. 19 as first author and 18 as co-author. Below is a selected list of some first author contributions to conferences I attended.

****EGU Research Highlight****

Wild, S, DJ Befort, GC Leckebusch

Potential Seasonal Predictability for Winter Storms over Europe

EGU2017-15785. EGU General Assembly. Vienna, Austria. 2017 (Poster)

****Outstanding Student Paper Award****

Wild, S, DJ Befort, A Weisheimer, JR Knight, HE Thornton, JF Lockwood, L Hermanson, GC Leckebusch

Extra-tropical Cyclones and Wind Storms in Seasonal Prediction Models

Abstract A23H-0333. AGU Fall Meeting. San Francisco, USA. 2016 (Poster)

Wild, S, DJ Befort, GC Leckebusch:

Large Scale Drivers for the Extreme Storm Season over the North Atlantic and the UK in Winter 2013-14

EGU2016-12702. EGU General Assembly. Vienna, Austria 2016 (Poster)

Wild, S, DJ Befort, GC Leckebusch:

Was the Extreme Storm Season in Winter 2013/14 Over the North Atlantic and the United Kingdom Triggered by Changes in the West Pacific Warm Pool?

5th European Windstorm Workshop. Berne, Switzerland, 2015 (Lecture)

Wild, S, T Kruschke, MG Donat, D Renggli, GC Leckebusch, U Ulbrich:

Losses due to Severe Wind Storms over Europe in a Future Climate.

UN - International Scientific Congress on Climate Change: Global Risks, Challenges & Decisions. Copenhagen, Denmark 2009. (Poster)

IOP Conf. Series: Earth and Environmental Science 6 (2009) 322013 doi:10.1088/1755-1307/6/2/322013.

Other first author appearances were at the following international conferences:

EGU General Assembly (6), EMS Annual Meeting (3), AGU Fall Meeting (2), European Windstorm Workshop (2), RMetSoc Conference (1)

Co-author appearances at international conferences:

EGU General Assembly (7), EMS Annual Meeting (2), AGU Fall Meeting (4), IAMAS/IACS Joint Assembly (2), ICESM (1), ACRE Workshop (1)

Software Development (2000)

I have been part of the developing and testing team of an objective and automated identification and tracking algorithm for windstorm events. This software was originally developed (without my contribution) at the Freie Universitaet Berlin and first documented in Leckebusch et al. (2008). My contributions involved primarily the testing of the scheme on different data sets, manipulating the output and the application on different HPCs.

The software is still being tested and not yet freely available but this is planned for the near future (~1-2 years).

Leckebusch, GC, D Renggli, U Ulbrich. 2008: Development and application of an objective storm severity measure for the Northeast Atlantic region. Meteorol Z. Vol (17). 575–587.

Awards, grants and scientific contribution (3000)

****Awards and Grants****

2016 Outstanding Student Paper Award (OSPA) at AGU Fall Meeting (\$150)

2015 Universitas 21 PhD Scholarship to visit the University of Melbourne (GBP 1,500)

2013 1st Poster Prize at Annual BEAR PGR Conference at University of Birmingham (GBP 300)

2012-2016 5 Travel Awards from various British Institutions & Societies (from GBP 250 to 500)

****Teaching Experience****

2014-2015 Lecturer in Applied Meteorology and Climatology Masters Course
Atmospheric Data Processing & Statistics (Programming Component)

2011-2017 Teaching Assistant (paid) in various MSc and BSc modules. In total about 150 hours.

2012-2016 Participation as teacher in 4 undergraduate physical geography field courses (either 4 or 5 days)

2011-2016 Co-Supervision of 5 MSc and 3 BSc dissertations

MSc dissertations:

-European Heat Wave Characteristics in Relation to Large Scale Variability Modes

-The Circumpolar Vortex in the 20th Century

-Examination of North American Blizzards and Associated Weather Types

-Changes of the Northern Hemispheric Circumpolar Vortex at the end of the 21st Century

-Investigating the Impact of Climate Variables on Meningitis Prevalence and Spatiality in West Africa

BSc dissertations:

-Climate Indices in Relation to Australian Droughts

-Periods of Extreme High Temperature and Heat Waves in the UK

-Potential Future Risk of Forest Fires in Germany

****Knowledge Transfer****

- between academia and the (re)insurance sector:

As described in some of the sections above, I have been involved in various projects in collaboration with the (re)insurance sector. All of the projects were considered knowledge transfer projects. I have been part of the “European Windstorm Community” consisting of scientists and members of the (re)insurance sector alike for about 5 years. This community meets regularly at the European windstorm workshop to discuss recent scientific advances relevant for industry and existing and potential knowledge transfer collaboration.

- from the University of Birmingham to a local company:

One further position I held (see also above) was part of a deliberate *local knowledge transfer* scheme initiated by the UK government. We provided scientific advice and continued to do so after the end of the project to a small enterprise in Birmingham developing greenhouse crop production systems.

Outreach and public engagement activities (3000)

- On 3 occasions in 2015 and 2016 I was involved in a weather balloon experiment as part of the University of Birmingham Open Days. The overall event is primarily designed for potential new undergraduate students but open for the general public.
- On 2 occasions in 2013 and 2014 I showed the Geography and Earth Science department at the University of Birmingham to potential new students and their parents.
- From 2007 to 2011 I was part of the organising committee at the Institute of Meteorology at Freie Universitaet Berlin for their contribution to the “Lange Nacht der Wissenschaften” (long night of sciences). This annual event takes place all across the city of Berlin and is designed for children and the interested laymen alike. I was also in charge of the students’ finances.
- I was the chief organiser of the “StuMeTa” (Students’ Meteorology Conference, <http://users.met.fu-berlin.de/stumeta2011/start.html>) in Berlin in 2011. This 5-day event with more than 300 participants is primarily designed for students but open for everyone. I was also in charge of the budget (>20k€).

Research Plan (4000)

Decadal Predictions of Wind Storm Risk over Europe (DecWiSE)

****Motivation****

Despite the high impact of windstorms over Europe and previous encouraging results(1), no efforts have been made recently in analysing decadal prediction skill of windstorm frequency or intensity. Studies regarding decadal prediction of windstorms from a multi-model perspective are completely missing. Decadal prediction systems are on the verge of becoming operational. Skill assessment of initialised decadal predictions regarding high impact quantities such as windstorms over Europe is thus absolutely crucial for their potential usability. The first part of the proposed research in DecWiSE will fill the outlined research gap in line with the ongoing H2020 project EUCP activities at the BSC.

The North Atlantic basin has been shown as the most predictable region of the world at multi-year to decadal time scales(2). North Atlantic SST exhibit multidecadal variations referred to as the Atlantic Multidecadal Variability (AMV). The AMV has been shown to influence the location and activity of the North Atlantic storm track and modulate anomalies of the NAO(3,4). The NAO in turn is the most important mode of variability for windstorm activity over Europe(5,6). In the second part of DecWiSE decadal windstorm variability will be analysed with a special focus on the role of the AMV. This research follows results of my PhD showing a potential decadal modulation of a seasonal link of North Atlantic SST and windstorm frequency and is in line with ongoing activities in the BSC’s Climate Prediction Group (CPG).

One of the key open science questions around decadal predictions is motivated by recent studies establishing that the typical atmospheric and oceanic resolutions used for global climate experimentation are a serious limiting factor to correctly reproduce both climate mean state and variability(7,8). DecWiSE will therefore also focus on the effect of decadal predictions of wind storms with unprecedented high resolution simulations only possible at the BSC.

****Research Approach****

****WP1: Decadal Prediction of Wind Storms****

The skill of decadal hindcasts of windstorms will be assessed in a probabilistic way: first using EC-EARTH and secondly in a multi-model multi-member framework. The way to combine different forecasts is a matter of ongoing research in the CPG and part of the EUCP project. The research in DecWiSE will contribute to these activities. Windstorm frequency and intensity will be analysed with an objective identification and tracking algorithm and a previously defined storm severity index (9).

****WP2: Low Frequency Modulation of Seasonal Link between SST and Windstorms****

The potential low frequency modulation of a seasonal link of North Atlantic SST and NAO or windstorm frequency respectively will be investigated in a pre-industrial control simulation (~500 years) of the CMIP6 version of EC-Earth in a statistical approach. The influence of the AMV on NAO and windstorm frequency anomalies will be analysed in the same simulation.

****WP3: Effect of Spatial Resolution on Decadal Predictions of Wind Storms****

Cutting-edge simulations with the EC-Earth coupled model in a world-leading high resolution configuration within the PRACE (Partnership for Advanced Computing in Europe) project HiResNTCP (High-Resolution Near-Term Climate Predictions) will be performed. These simulations offer a unique possibility to analyse the effect of resolution on decadal prediction skill for climate extreme events such as windstorms and related physical mechanism at decadal scales such as the AMV.

****Impact****

Besides the invaluable positive impact DecWiSE will have on my personal career, the interest from both academia and industry can be expected to be very high. At least 3 publications are foreseen (one for each WP). A preliminary outline of DecWiSE already received interest from a major global reinsurer who would also state their support if necessary.

- (1) Kruschke et al. (2015) Probabilistic evaluation of decadal prediction skill regarding Northern Hemisphere winter storms. *Meteorol. Z.*, Vol. 25, No. 6, 721–738, doi :10.1127/metz/2015/0641
- (2) Doblus-Reyes et al. (2013) *Nat. Comm.* 4:171. doi: 10.1038/ncomms2704
- (3) Hakkinen et al. (2011) Atmospheric blocking and Atlantic multidecadal ocean variability. *Science*.334(6056):655-9. doi: 10.1126/science.1205683.
- (4) Peings and Magnusdottir (2014) Forcing of the wintertime atmospheric circulation by the multidecadal fluctuations of the North Atlantic ocean. *Environ. Res. Lett.* 9 034018 (8pp). doi: 10.1088/1748-9326/9/3/034018.
- (5) Hurrell et al. (2003) The North Atlantic Oscillation, Climate Significance and Environmental Impact, AGU Geophysical Monograph,134, pp. 1–35.
- (6) Donat et al. (2010) Examination of wind storms over Central Europe with respect to circulation weather types and NAO phases *Int. J. Climatol.* 30: 1289–1300. doi: 10.1002/joc.1982
- (7) Hewitt et al. (2017) Climate Observations, Climate Modeling, and Climate Services. *Bull. Amer. Meteorol. Soc.*, 98, 1503-1506, doi: 10.1175/BAMS-D-17-0012.1. doi: 10.1175/BAMS-D-17-0012.1
- (8) Smith et al. (2016) Seasonal to decadal prediction of the winter North Atlantic Oscillation: emerging capability and future prospects *Q.J.R.Meteorol.Soc.*142: 611 – 617, doi: 10.1002/qj.2479
- (9) Leckebusch et al. (2008) Development and application of an objective storm severity measure for the Northeast Atlantic region. *Meteorol Z.* Vol (17). 575–587. doi: 10.1127/0941-2948/2008/0323

Motivation to become a BSC Stars Postdoc (4000)

I would be very excited to become a Stars Postdoc giving me the opportunity to apply and share my expertise and abilities I have acquired as part of my previous positions and allow me to improve and further develop upon these skills boosting my academic career.

Most of my research knowledge I have obtained in the field of climate diagnostics and the analysis of extreme meteorological events. I specialised in the field of ETCs and associated windstorms, including the analysis of relevant processes and mechanisms from synoptic to decadal time scales, skill assessment of seasonal forecast systems, and the estimation of socioeconomic impacts. Simultaneously I have been in constant contact with the (re-)insurance industry which has shown a strong interest in research on ETCs and windstorms as the single most costly natural hazard in Europe.

Through the proposed Stars Postdoc position, I would be able to continue this research and maintain the interest of my work by the insurance sector but could reach augmented levels of impact both in academia as in industry given the framework the BSC offers to engage with the industry.

The experience of the BSC's CPG in understanding prediction mechanisms and forecast quality assessment as well as the involvement in international research projects would be greatly beneficial for my proposed research in DecWiSE. I would add knowledge and experience in the field of diagnostics of climate extreme events and their underlying physical mechanisms, especially for ETCs and windstorms to the group. At the same time, I would benefit from the knowledge about techniques on how to best combine multi-model – multi-member information and uncertainty estimations.

The Earth System Services Group (ESSG) with their experience in bridging the gap between science and the “real world” would help to make the proposed research more understandable by the insurance sector but could also help to identify and reach a larger audience and private sector actors, thus increasing the dissemination and impact level of my research. My experience in working with partners from the insurance sector and network I could establish over the years would be also beneficial for the ESSG.

BSC's supercomputer MareNostrum4 is essential for the performance of computational expensive high resolution climate predictions. Without it the outlined research of DecWiSE would not be possible. From a climate modelling perspective, the available computing facilities at the BSC make it generally a very attractive work place.

Decadal prediction research is still in its infancy and the added-value of initialised simulations for applications such as the (re)insurance market has yet to be shown. The H2020 project EUCP shows the commitment of the European Commission to the development of decadal prediction systems and their belief in the high potential decadal research yields. I would be highly motivated to be part of decadal research from early stages onwards and contribute to its success. The EUCP project at the BSC, involving researchers from the CPG and ESSG, together with the technical infrastructure, would therefore provide an excellent framework.

Finally, due to the BSC's international collaborations and staff, I would be delighted to link my personal career stronger to the BSC in general and its ongoing activities such as being an integral part of the EC-Earth community. Both my academic career as well as my personal life are strongly characterised by internationality: I have worked and studied in 4 different countries and I am lucky enough to be father of a child with 3 nationalities.

BSC project selected for the Stars Programme (3 projects)

Project 16: Climate Prediction Group (1), Group Leader: FRANCISCO DOBLAS-REYES

Project 17: Climate Prediction Group (2), Group Leader: PABLO ORTEGA and LOUIS PHILIPPE CARON

Project 20: Earth System Services Group(1), Group Leader: ALBERT SORET