

## 1 BASIC INFORMATION

---

### Personal Details

Surname:	SINCLAIR
Given Names:	Victoria Anne
ORCID ID:	0000-0002-2125-4726
Date of birth:	10.10.1983
Current Position:	University Researcher, University of Helsinki, 01.2013 – present Group Leader, Dynamic Meteorology group 01.2014 – present

### Degrees awarded

Ph.D. (Meteorology)	03.07.2009, University of Reading, UK. ( <a href="http://www.met.reading.ac.uk/">http://www.met.reading.ac.uk/</a> ) Thesis title: <i>“Boundary-Layer Ventilation by Baroclinic Life Cycles”</i> .
B.Sc. (Meteorology)	08.07.2005, University of Reading, UK Degree name: <i>Meteorology with a Year in Oklahoma (1st Hons)</i>

### Previous employment

04.2009 – 12.2012	Post-Doctoral Researcher, University of Helsinki (UHEL), Finland
10.2005 – 03.2009	Doctoral Student, University of Reading, UK
07.2004 – 03.2007	Assistant forecaster (part time), RaceMet Radar Systems
07.2003 – 10.2003	Assistant research scientist, Satellite Applications, UK Met Office

## 2 QUALIFICATIONS IN RESEARCH AND DOCTORAL TRAINING

---

My research covers a wide range of topics, from small-scale processes such as microphysics parameterizations to large-scale topics such as extra-tropical cyclones in a changing climate. My research eloquently bridges the gap between weather and climate. All of my research is motivated by the need to improve understanding and numerical simulation of a range of weather and climate phenomena and thus increase the accuracy and reliability of weather forecasts and future climate predictions. I address this need by utilising state-of-the-art numerical models such as OpenIFS, reanalysis data sets, and by combining models and observations. My own on-going research topics include:

- **EXTREME EXTRA-TROPICAL CYCLONES IN THE FUTURE.** Pseudo-climate change experiments are conducted with OpenIFS and the structure of the 200 strongest (top ~5%) cyclones in each climate are examined. Initial results show winds speeds and precipitation increase as the climate warms but unexpectedly that the structure of the cyclones also changes. A manuscript on this topic will be submitted by the end of 2017.
- **MOISTURE TRANSPORT TO ANTARCTICA BY EXTRA-TROPICAL CYCLONES.** ERA-Interim reanalysis data is utilised along with an objective cyclone detection and tracking algorithm. The amount of moisture transported to Antarctic is mainly controlled by the speed and track orientation of the cyclones, not the intensity of the cyclones. A manuscript on this topic is very nearly ready and will be submitted to Journal of Geophysical Research in September 2017.
- **THE HIMALAYAN AEROSOL FACTORY.** Can particles observed to form (and measured by UHEL colleagues) near Everest base camp be efficiently transport to the free troposphere? Pioneering, high resolution FLEXPART (a Lagrangian dispersion model) experiments I have designed

and performed indicate yes. A manuscript, which I am a co-author on, on this topic is under preparation and will be submitted to Nature in September 2017.

### Honours and awards by scientific societies

2016 – present	Elected Fellow of the Royal Meteorological Society (FRMetS)
2014	Editors' Citation for Excellence in Refereeing – Journal of Geophysical Research Atmospheres
2012	European Meteorological Society Young Scientist Travel Award (€685)
2011	University of Helsinki Chancellor's Travel Grant (€1000)
2008	Student award for best presentation at the American Meteorological Society 18th Symposium on boundary layers and turbulence.
2008	Adrian Gill Travel Award, European Geosciences Union (€650)
2007 – present	Member of the American Meteorological Society
2005 – 2015	Associate fellow of the Royal Meteorological Society
2001 - 2004	UK Met Office Undergraduate Scholarship (£4500)

### Nature and scope of publications

All of my papers are published in highly respected journals. Furthermore, I have many publications which are independent of my Ph.D supervisors, almost half of my papers I am first author of (7 /16), and I have one single author paper: I can publish independently. My Ph.D was examined on the basis of a monograph style thesis (this is standard in all UK universities). However, during and shortly after I completed my Ph.D, I also published 3 first author papers on the work I had completed as a PhD student.

### Positions of scientific expertise

2017 - 2018	Royal Meteorology Society and NCAS (National Centre for Atmospheric Science, UK) joint conference organising committee.
2017	Organiser and founder of the 1st "Finnish storms" workshop.
2017 - present	Co-convener, " <i>Understanding and modelling of atmospheric hazards and severe weather phenomena</i> " session, European Meteorological Society conference.
2016	Co-convener, " <i>Dynamical Meteorology</i> " Session, European Meteorological Society conference.
2014 - present	Group Leader of Dynamical Meteorology Research Group, Division of Atmospheric Sciences. UHEL.
2012 - present	American Meteorology Society Boundary Layer and turbulence conference organising committee
2006 – 2008	Royal Meteorology Society student conference organising committee.

### International activities

- Active member of the OpenIFS international community. In June 2017, I was an invited speaker at the OpenIFS workshop, Trieste, Italy. In 2013, I organised the first OpenIFS workshop in Helsinki.
- Active co-convener of sessions at the European Meteorological Society annual conference. Active contributor to the redesign of the conference structure for 2017.

- Contributed to the HIRLAM-C Management group visit to FMI (June 2016) by discussing my work on validating ice microphysics schemes using remote sensing observations. HIRLAM-C is European consortium which develops a comprehensive mesoscale weather prediction model.
- I have participated in the Nordic Centre of Excellence project “eSTICC (eScience Tools for Investigating Climate Change at High Northern Latitudes)”. I hosted Dr Thomas Toniazzo, Bjerknes Centre for Climate Research, University of Bergen, for a 1 week visit in September 2017 as part of this project and will host another 2 week visit in February 2018. A joint publication comparing two different models and their response to climate change in a simplified aqua-planet set-up is planned.
- Attended many international conferences: to date I have given 28 presentations.

### Scope and management of external research funding and projects

2016, 2017	Supervisor for M.Sc. Meri Virman’s funded Väisälä project “The unsaturated downdraft: a new mechanism regulating deep convection” (€23,000 per year)
2015	Väisälä award (€2500) to invite an international visitor to Helsinki
2015, 2016, 2017	Supervisor for M.Sc. Minttu Tuononen’s funded Nessling project “Experimental studies on environmental conditions and stresses impacting renewable energy production in the Finnish Sea regions” (€23,500 per year)

As a post-doctoral researcher funded by the Finnish Academy grant “*Helsinki Testbed observations and idealised simulations of fronts in northern latitudes*”, I was largely responsible for managing the finances of this grant due to the absence of the PI. I was also responsible for recruiting students to this project and for reporting on the project progress to the Finnish Academy.

### National and international research collaboration

- *Finnish Meteorological Institute*. I have three main collaborations with FMI: Extra-tropical cyclones and their correlation with North Atlantic sea surface temperatures with Prof. Timo Vihma and Prof. Petteri Uotila (now at UHel), high-impact windstorms with Dr Hilppa Gregow and OpenEPS project (combining OpenIFS with an ensemble prediction system) with Dr Pirkka Olinaho.
- *European Centre for Medium Range Weather Forecasts (ECMWF)*: I have extensive collaboration with Dr Glenn Carver, OpenIFS project manager. Specific topics of on-going collaborative efforts include the development of idealised test cases with OpenIFS and the preparation of a manuscript describing OpenIFS. Previously I have hosted Dr Carver at the University of Helsinki (1 week in 2013 and 1 week in 2015). I visited ECMWF in 2016 for one week and in December 2017 ECMWF invited me to visit as part of their “visiting experts program” and therefore funded the visit.
- *L’Aquila University, Italy*. I collaborate with Paolo Ruggieri and supervise a M.Sc. student on the broad topic of storm tracks. The collaboration is based around the OpenIFS model. I hosted Paolo Ruggieri for a 1 week visit to Helsinki in January 2016.
- *University of Reading, UK*. I collaborate with Assoc. Prof. Helen Dacre on the topic of moisture transport by extra-tropical cyclones to Antarctica. A joint manuscript is under preparation. I hosted Prof. Dacre at the University of Helsinki for a 6 week visit in June / July 2015. I visited Reading for 1 week in May 2014.
- *State University of New York - Albany, USA*. I collaborated with Prof. Daniel Keyser on the topics of fronts. We have a joint manuscript published in 2015. I visited Albany twice (2011, 2012), giving an invited seminar both times.

- *Exeter University, UK.* I have an on-going collaboration with Dr. Jennifer Catto (previously at Monash University, Australia) on the role of tropical sea surface temperatures on the location of storms tracks and the amount of precipitation associated with fronts and extra-tropical cyclones. I hosted Dr Catto for a 1 month visit to University of Helsinki in 2015.

### **Competencies in applying research findings**

- Model development work I have conducted has fed back to the main developers, for example, I configured OpenIFS into an aqua-planet and then passed this knowledge back to ECMWF.
- I communicate my recent research results to students by including relevant research results in my lectures.

### **Coordination of doctoral training or other participation in nationwide doctoral programmes**

- I am a supervisor within the Doctoral Programme in Atmospheric Sciences. I attend training sessions and follow best practice guidelines closely.
- As leader of the Dynamic Meteorology group at the University of Helsinki, I ensure all doctoral students in our group receive excellent supervision, training and are well informed of doctoral school requirements.

### **Number of postgraduate students**

In currently co-supervise 4 Ph.D students (2 at UHEL and 2 at FMI) and 1 M.Sc. student at the University of L'Aquila, Italy. Ph.D students and topics are listed below:

- Terhi Laurila (FMI, 2017-) "Windstorms in Finland: Characteristics and impacts"
- Meri Virman (UHEL, 2016-) "The unsaturated downdraft: a new mechanism regulating deep convection"
- Mika Rantanen (UHEL, 2016-) "Dynamics of extra-tropical cyclones in the future"
- Minttu Tuononen (FMI, 2015-) "Experimental studies on environmental conditions and stresses impacting renewable energy production in the Finnish Sea regions"

### **Postgraduate supervision and teaching methods**

As co-supervisor for 4 Ph.D. students I provided regular support in the form of weekly meetings and hands-on practical help with the more technical aspects of their research. In supervisor meetings, I guide the student to develop their own research rather than giving specific tasks and answering all of their questions. I stress the importance of the complete research process, from setting hypothesis and research questions to evaluating results and drawing conclusions. I also actively write with students, especially their first paper, so that students develop scientific writing skills.

### **Number of supervised dissertations**

I have supervised two B.Sc. (Luk) theses and 11 M.Sc. (Gradu) theses to completion. In addition, I supervised a Fulbright undergraduate student (Sol Kim) for 9 months which resulted in one publication.

### **Experience as a dissertation pre-examiner and opponent**

I evaluated one Ph.D thesis from the ETH Zurich: "Air-sea interaction over the Southern Ocean: On the role of extratropical cyclones, fronts and cold air outbreaks." (2016).

### 3 TEACHING QUALIFICATIONS

#### Teaching experience

I have extensive teaching experience including lectures, problem classes, computer practicals, intensive courses and field trips. I have designed and delivered two complete lectures courses (Synoptic Meteorology 1 and 2, each 28 hours of lectures) and have played a fundamental role in the development and teaching of the hands-on course Numerical Laboratory. In addition, I have been a guest lecture in two courses, an invited lecturer on an international winter school and an assistant on several courses at the University of Helsinki (UHEL) and the University of Reading (UoR). Recent courses I have taught:

2017	Invited Lecturer, Winter school on the observation and modelling of high-latitude and Arctic clouds. co-organised by the Collaborative Research centre, Arctic Amplification (AC3 - Germany) and UHEL
2013 – 2017	Lecturer, Synoptic Meteorology 1, UHEL (taught every year)
2015, 2017	Lecturer, Synoptic Meteorology 2, UHEL
2015, 2016, 2017	Assistant lecturer, Numerical Laboratory, UHEL
2014, 2015, 2016	Guest lecturer, Introduction to Modern Atmospheric Sciences, UHEL
2014, 2015, 2016	Guest lecturer, Presentation of Physical Sciences, UHEL

#### Pedagogical training

Autumn 2015	Teaching with Technology (3 ECTS, Pass)
Spring 2015	Academic Supervision (UP3, 5 ECTS, Grade 5)
Spring 2014	Teaching and Learning in Higher Education (UP2, 5 ECTS, Grade 5)
Spring 2014	Constructive Alignment in Higher Education (UP1, 5 ECTS, Grade 5)

#### Ability to produce teaching materials

I have created all of the teaching material for synoptic meteorology 1 and 2. This consists of PowerPoint lecture slides and complementary lecture notes which are all available on-line. The lecture notes (15 - 20 pages per course) contain essential information, equations and references. I prepared technical instructions for the numerical laboratory course which received excellent student feedback.

#### Other teaching merits

- *Confident lecturer, not reliant on PowerPoint:* Most of my teaching is based around lectures. During lectures, although I prepare comprehensive slides which are available to students online, I primarily write and draw on the board. I encourage students to ask questions.
- *Awareness of student activation:* To retain student's attention, I regularly ask the class questions and only speak for a maximum of 20 minutes at a time. During lectures I ask students to discuss in small groups specific topics or problems related to the current lecture topic. I have successfully activated students using Presemo, a simple-to-use online tool which can be used for polls, votings etc. which also provides instant feedback for me.
- *Courses and assessment based on pedagogical studies:* In the synoptic meteorology 2 course, where I expect students to take responsibility for their own learning and achieve higher forms of thinking (e.g. analysing and evaluating, rather than just remembering), I have achieved good results by ensuring the assessment methods are constructively aligned with this aim. The assessment in the course is via a blog-style (short, regular entries) learning diary, exercises and a written case study / scientific report where students must analysed a weather event of their own choice. The learning diary was particularly successful as students could reflect on the topics and I also received very timely feedback which I could act upon during the course.

- *Excellent student feedback*: I have consistently received positive feedback from students. I react to student feedback by modifying my courses and consequently continue improving my courses. Examples of feedback from students (available in WebOodi) are: “*Your way to teach is exhilarating*” and “*The learning diary is a great way to learn constantly through the course. Doing the case study I finally understood some things that I didn’t properly understand and the writing work was really educative*” and “*The best part was a great lecturer, she is professional and teaches in a way that is easy to follow*”.
- *Recognition*: Nominated for the best teacher in Physics 2015.

#### 4 OTHER QUALIFICATIONS AND MERITS

---

- Invited speaker, Dynamic Meteorology Session, EGU, 2018.
- Reviewer of proposals submitted to the H2020-MSCA-IF-2017 Marie Skłodowska-Curie Individual Fellowships call in 2017
- Associate Editor for Monthly Weather Review (2009 – 2011)
- Extensive peer review service: Reviewer of manuscripts for Atmospheric Chemistry and Physics, Atmospheric Science Letters, Boreal Environment Research, Geophysical Research Letters, Journal of Atmospheric Sciences, Journal of International Climatology, Journal of Geophysical Research, Meteorological Applications, Monthly Weather Review and Quarterly Journal of the Royal Meteorological Society. In total I have reviewed ~25 manuscripts
- Organiser of the Division of Atmospheric Sciences seminar series (2014 – present )
- Extensive numerical modelling skills; extensive experience of high performance computing
- Knowledge of many programming languages / software: FORTRAN, bash, matlab, IDL, CDO, NCL, html