

# CV - François Counillon

## Personal information

First name, Surname:	François, Counillon		
Date of birth:	07.04.1979	Sex:	Male
Nationality:	French		
Researcher unique identifier(s)	<a href="https://scholar.google.no/citations?user=ST7FjOYAAAAJ&amp;hl=en">https://scholar.google.no/citations?user=ST7FjOYAAAAJ&amp;hl=en</a> Cristin-person-ID: 399984		
URL for personal website:	<a href="https://www.nersc.no/staff/francois-counillon">https://www.nersc.no/staff/francois-counillon</a>		

## Education

Year	Faculty/department - University/institution - Country
2008	PhD thesis University of Bergen – Norway (12/09/08), “Ensemble-based data assimilation and forecasting with an eddy-resolving model of the Gulf of Mexico”
2003	Master in applied mathematics at Informatiques, Mathématiques et Mathématiques appliquées- Université Joseph Fourier, Grenoble - France

## Positions - current and previous

Year	Job title – Employer - Country
2020-	Leader of the Climate dynamics & prediction group (13 pers.) – NERSC - Norway
2018-	Project manager – Nansen Environmental and Remote Sensing Centre (NERSC) - Norway
2016-	Adjunct associate professor (20%) - University of Bergen -Norway
2016-2020	Deputy leader of the Climate dynamics & prediction group (12 pers.) – NERSC - Norway
2014-2017	Associate researcher, seconded - Nansen-Tutu Center, Cape Town – South Africa
2014-2015	Leader of data assimilation & forecasting group (7 pers.) – NERSC - Norway
2010-2018	Researcher II – NERSC – Norway
2008-2010	Postdoctoral fellow – NERSC – Norway

## Project management experience

Year	Project owner - Project - Role - Funder
2022-2025	NERSC- Proxy Assimilation for Reconstructing Climate and Improving Model ( <b>1 M€</b> ) - <b>PI</b> - Senter for klimadynamikk ( <b>SKD</b> )
2020-2028	NORCE- Centres for Research-based Innovation “Climate Futures”( <b>20 M€</b> ) <a href="https://www.climatefutures.no">https://www.climatefutures.no</a> – <b>co WP leader</b> -Research Council of Norway(NFR)
2020-2023	NERSC- “PhD on seasonal prediction of Harmful Algae Bloom” ( <b>300k€</b> )- <b>PI</b> -NFR

2018-2021	NORCE -“Infrastructure for Norwegian Earth System modelling” (6M€), <b>WP leader</b> -NFR
2018-2022	NORCE- “Seasonal forecast engine” (1.5 M€)- <b>WP leader</b> – NFR
2015-2021	UiB- “Synchronisation to enhance reliability of climate prediction” <a href="https://stercpproject.w.uib.no/">https://stercpproject.w.uib.no/</a> , (2M€)- <b>lead developer</b> - EU H2020 ERC Consolidator
2014-2017	UiB- “Enhancing seasonal-to-decadal Prediction Of Climate for the North Atlantic Sector and Arctic” (2M€), <b>WP leader</b> - NFR

### Supervision of students

Master's students	Ph.D. students	University/institution - Country
6	3	Master: NERSC, Bergen Norway/ Institute of Atmospheric Physics Beijing China/ University of Bergen Norway/ Ecoles des Mines de Paris France  PhD: University of Cape Town – South Africa/ University of Bergen Norway

### Other relevant professional experiences

Description - Role
<b>Institutional responsibilities and board memberships</b>
2017- : Member of leader group of the Bjerknes Center for Climate research (BCCR)
2019: Chairperson for PhD committee at University of Bergen
2016 & 2018: Master thesis review at University of Cape-Town, South Africa
2017: PhD opponent at University of Liège, Belgium
2014-2016: Member of the Board at NERSC, Bergen, Norway
<b>Reviewing activities</b>
<b>Guest editor</b> for Frontiers in Climate, Past Reconstruction of the Physical and Biogeochemical Ocean State (2020); “Regional Coupled Model and Data Assimilation” Advances in Meteorology (2018)
<b>Project Evaluation:</b> Belg-FED-twin (2021); Gulf Ocean Systems (USA-UGOS)-2 Grant Competition (2019), UK NERC (2017, 2019), EU-CMEMS (2018), EU-PRACE (2018), US National Science Foundation (2016)
<b>Reviewer for journals:</b> Nature Rev. Earth & Environment, Nature Comm., JAMES, QJRMS, Clim. Dyn, Ocean Dyn, Tellus, JGR, Ocean Model, Polar Res., Ocean Sci., GRL, J. Climate, J. Oper. Oceanogr.
<b>Teaching activities</b>
2019 & 2013: Summer school on Data Assimilation, Romania
2017: Crash Course on Data Assimilation, Bergen, Norway
2014: Examiner of final exam: Data Analysis in Meteorology and Oceanography (GEOF210), UiB
2011: Nansen-Tutu / EAMNet / ACCESS winter school, Cape Town, South Africa

**Total publications (peer reviewed journal articles): 47**

**Total citations:** 1375 (Google scholar)

**H index:** 23 (Google scholar)

## 10-year track record

I apply, test and revisit theoretical methods in data assimilation (DA) and modeling to enhance the skill of dynamical predictions. I have worked in operational oceanography and seasonal-to-decadal predictions. My research has led the development of several major prediction systems:

- 1) The Norwegian Climate Prediction Model (NorCPM) addresses the problem of seasonal-to-decadal prediction; contributes to the WMO Lead Centre for Annual-to-Decadal Climate Prediction and to the CMIP6 Decadal Prediction Project (DCPP). This system is unique as it features advance ensemble DA with an isopycnal coordinate ocean model and carries strongly coupled in the ocean and sea ice component.
- 2) The TOPAZ system is the main marine core system for the Arctic region in Copernicus (<http://www.copernicus.eu>) and the Norwegian contribution to the Global Ocean Data Assimilation Experiment (GODAE). It is the first ocean forecasting system using strongly coupled ocean and sea ice data assimilation system and the advanced Ensemble Kalman Filter operationally.
- 3) The first prototype of a supermodel for Earth system modelling with connection via the ocean of MPIESM, CESM and NorESM (a paper is in preparation).
- 4) Several high-resolution forecasting regional systems for the Gulf of Mexico, the South China Sea and the Agulhas Region (first regional forecasting system of South Africa)

I have authored and co-authored 47 peer review publications. According to google scholar, my publications have been **cited a total of 1375 times, with a h-index of 23**. Below is a selection of 10 peer reviewed publications during the last 10 years. When I am not first author on the list below, the paper was often led by postdoc, or young research scientist (\* I was the main supervisor of the Postdoc). In such a case, I contributed very actively (providing key ideas, designing experiments, coding, analysis and writing). A comment is posted for few exceptions, where I had a less prominent role:

1. **Counillon, F.**, Keenlyside, N., Toniazzo, T. *et al.* Relating model bias and prediction skill in the equatorial Atlantic. *Clim Dyn* (2021) **[4 citation]**. Use an innovative modelling technique to constrain model bias and show its importance for enhancing prediction skill in the tropical Atlantic
2. Fransner, F., **Counillon, F.**, I. Bethke, J. Tjiputra, A. Samuelsen, A. Nummelin, and A. Olsen, Ocean Biogeochemical Predictions—Initialization and Limits of Predictability. *Frontiers in Marine Science*, 2020. **[4 citation]**. *Demonstrates that physics controls most of biogeochemistry variability beyond seasonal timescale and that skilful predictions can be achieved up to several years lead time in key regions.*
3. D. Smith, ..., **F. Counillon** et al., North Atlantic climate far more predictable than models imply, *Nature*, 2020 **[45 citation]**. *Shows that winter climate of Europe can be predicted up to ten years in advance. This was possible by performing a huge number of prediction experiments to unmask the predicable dynamics hidden by large errors in modelling scale interactions.* I contributed with providing data and editing the text.
4. \* Wang, Y., **Counillon, F.**, Keenlyside, N., Svendsen, L., Gleixner, S., Kimmritz, M., Dai, P. and Gao, Y., 2019. Seasonal predictions initialised by assimilating sea surface temperature observations with the EnKF. *Climate Dynamics*, 2019, **[6 citations]**. *Demonstrates competitive seasonal predictions skill against state-of-the-art prediction systems by assimilating only sea surface temperature (SST) with advanced DA.*
5. \* Kimmritz, M., **Counillon, F.**, Smedsrud, L.H., Bethke, I., Keenlyside, N., Ogawa, F. and Wang, Y., 2019. *Impact of Ocean and Sea Ice Initialisation On Seasonal Prediction Skill in the Arctic. Journal of Advances in Modeling Earth Systems.* **[9 citations]**. *Demonstrated that the skill of NorCPM performs best in key regions of the Arctic. Identified the key quantities yielding predictions skill indifferent regions of the Arctic.*
6. \* Kimmritz M., **Counillon F.**, Bitz C.M., Massonnet F., Bethke I., Gao Y. Optimising assimilation of sea ice concentration in an Earth system model with a multicategory sea ice model, *Tellus A.*, 2018. **[25 citations]**. *First demonstration of strongly coupled DA of ocean and sea ice within an Earth System model and shows the crucial role of sea-ice multicategory updates.*

7. **Counillon F**, Keenlyside N, Bethke I, Wang Y, Billeau S, Shen M-L, Bentsen M. Flow-dependent assimilation of sea surface temperature in isopycnal coordinates with the Norwegian climate prediction model. *Tellus A*. 2016. [36 citations]. *First demonstration of NorCPM with real data. Major indices of climate variability can be controlled by assimilating SST, thanks to assimilation carried in isopycnal coordinate and advanced ensemble DA.*

8. **F. Counillon**, I. Bethke, N. Keenlyside, M. Bentsen, L. Bertino and F. Zheng, Seasonal-to-decadal predictions with the Ensemble Kalman Filter and the Norwegian Earth System Model: a twin experiment, *Tellus A*, 66, 21074, 2014. [42 citations]. *Foundation paper for the Norwegian Climate Prediction tested in idealized framework – NorCPM is one of the first climate prediction system using advanced DA.*

9. F. Massonnet, H. Goose, T. Fichet, and **F. Counillon**. "Calibration of sea ice dynamic parameters in an ocean-sea ice model using an ensemble Kalman filter." *JGR*, 119, 2014. [38 citations]. *First demonstration of parameters estimation of ocean-sea ice with Ensemble DA.* Contributed to coding, analysis of experiment, and writing.

10. P. Sakov, **F. Counillon**, L. Bertino, K.A. Lisaeter, P.R. Oke, and A. Korabely, TOPAZ4: an ocean-sea ice data assimilation system for the North Atlantic and Arctic, *Ocean Science*, 8, 633-656, 2012. [303 citations]. *First operational oceanography system using the advanced Ensemble Kalman Filter.*

### **Invited presentations to peer-reviewed, international conferences**

- 2021 Mathematics of Climate Science (CIMPA), Kigali, Rwanda (postponed because of COVID-19)
- 2019 Big data, data assimilation, and uncertainty quantification (12-15 Nov), Institut Henri Poincaré, Paris, France
- 2019 International Computing in the Atmospheric Sciences (iCAS) symposium (8-12 Sept), Stresa, Italy
- 2018 Workshop on Climate Data Assimilation, Model Initialization and Parameter Estimation (4-5 Oct), Tremsbüttel, Germany
- 2016 Workshop on Initialization of High-Resolution ESMs (April 9-10)- NOAA Maryland, USA
- 2016 Sea Ice Thickness workshop at National Center for Atmospheric Research, Boulder, USA
- 2016 Nansen-Zhu Summer School, Climate teleconnections & predictions, Beijing
- 2015 Coupled Data Assimilation Symposium, IAP Beijing, China
- 2015 "Les Houches Ensemble data assimilation workshop", Les Houches, FRANCE

### **Organisation of international conferences in the field of the applicant**

- 2021 Organiser of Multi-annual to Decadal Climate Predictability in the North Atlantic-Arctic Sector, 5-7 June; 60+ participants
- 2019 Co-organizer of Workshop on Climate Prediction in the Atlantic-Arctic sector, University of Bergen, Norway, 5-7 June; 50+ participants
- 2016 Co-organizer of Workshop on Climate Prediction in the Arctic Atlantic sector, University of Bergen, Norway, 13-14 June; 40+ participants

### **Academy memberships**

- 2019- Contact point in Norway for CMIP6, Decadal Prediction Project (DCPP)
- 2019- Member of the CLIVAR Global Synthesis and Observation Panel
- 2017- Member of the GODAE - Global Ocean Data Assimilation Experiment Team
- 2009- Member of the European Geophysical Union

### **Major contributions to the early careers of excellent researchers**

2014-2017 Y. Wang postdoc: has been granted a prestigious Research Council of Norway Young Research Talent grant in 2020 (1M€)