2021 EnKF workshop program

Monday 07/06/2021

13:00-13:45	**Observation uncertainty in data assimilation** Sarah Dance University of Reading, UK	Session chair: Geir Evensen, NORCE/NERSC
13:45-14:15	**A methodology to obtain model-error covariances due to the discretization scheme from the parametric Kalman filter perspective** Oliver Pannekoucke[1,2,3], R. Ménard[4], M. El Aabaribaoune[3], M. Plu[2] [1]INPT-ENM, France; [2]CNRM, France; [3]CERFACS, France; [4]Environment and Climate Change Canada, Canada	
14:15-14:45	**Parametric Kalman Filter for Earth's radiation belts dynamics** Martin Sabathier[1], Vincent Maget[1], Olivier Pannekoucke[2,3,4] [1]ONERA, France; [2]INPT-ENM, France; [3]CNRM, France; [4]CERFACS, France	
14:45-15:15	**Machine Learning for Model Error in Numerical Weather Prediction** Patrick Laloyaux[1], Thorsten Kurth[2], David Hall[2], Peter Dueben[1], Massimo Bonavita[1] [1]ECMWF; [2]NVIDIA	Session chair: Laurent Bertino, NORCE
15:15-15:45	**Data Assimilation through constrained Deep Learning** Christopher Irrgang, Jan Saynisch-Wagner Helmholtz Centre Potsdam, German Research Centre for Geosciences (GFZ), Germany	
15:45-16:15	**Multilevel ensemble Kalman-Bucy filters** Neil Chada, Ajay Jasra, Fangyuan Yu KAUST, Saudi Arabia	Session chair: Andreas, Stordal, NORCE
16:15-16:45	**Multilevel and multi-index ensemble Kalman filtering algorithms** Gaukhar Shaimerdenova[1], Håkon Hoel[2], Raul Tempone[1] [1]KAUST, Saudi Arabia; [2]RWTH Aachen, Germany	
16:45-17:15	**Approximately accounting for multilevel modeling error in multilevel data assimilation** Mohammad Nezhadali[1,2], Tuhin Bhakta[1], Kristian Fossum[1], Trond Mannseth[1] [1]NORCE, Norway; [2]University of Bergen, Norway	
17:15-17:45	**Numerical discretization causing error variance loss and the need for inflation** Richard Ménard[1], Sergey Skachko[1], Olivier Pannekoucke[2,3,4] [1]Environment and Climate Change Canada, Canada; [2]INPT-ENM, France; [3]CNRM, France; [4]CERFACS, France	Session chair: Patrick Raanes, NORCE
17:45-18:15	**Assimilation of a Coordinated Fleet of Unmanned Aircraft Systems Observations in Complex Terrain Using High-Resolution EnKF** Anders Jensen[1], J. Pinto[1], S. C. C. Bailey[2], R. A. Sobash[1], G. de Boer[3], A. Houston[4], P. Chilson[5], T. M. Bell[5], Glen Romine[1], S. Smith[2], D. Lawrence[6], C. Dixon[6], J. K. Lundquist[6], J. Jacob[7], J. Elston[8], Sean Waugh[9], D. Brus[10], M. Steiner[1] [1]NCAR, USA; [2]University of Kentucky, USA; [3]CIRES, USA; [4]University of Nebraska-Lincoln, USA; [5]University of Oklahoma, USA; [6]University of Colorado Boulder, USA; [7]Oklahoma State University, USA; [8]Black Swift Technologies, USA; [9]NSSL, USA; [10]Finnish Meteorological Institute, Finland	
18:15-18:45	**Machine Learning Techniques to Construct Patched Analog Ensembles for Data Assimilation** Lucia Minah Yang, Ian Grooms University of Colorado Boulder, USA	

*Invited talks in **blue** color, speakers' names underlined, and titles in **boldface**

Tuesday 08/06/2021

13:00-13:45	**Data assimilation in chaotic systems: from dynamically-based to data-driven approaches** Alberto Carrassi[1,2], Marc Bocquet[3], Julien Brajard[4], Colin Grudzien[5], Laurent Bertino[4], Jonathan Demaeyer[6], Patrick N. Raanes[7], Stephane Vannitsem[6], Ali Aydogdu[8], Chris Jones[9], Christian Sampson[9] [1]University of Reading, UK; [2]Utrecht University, The Netherland; [3]CEREA, France; [4]NERSC, Norway; [5]University of Nevada Reno, USA; [6]RMI, Belgium; [7]NORCE, Norway; [8]CMCC, Italy; [9]University of North Carolina, USA	Session chair: Yuqing Chang, NORCE; Xiaodong Luo, NORCE
13:45-14:15	**State, global and local parameter estimation using local ensemble Kalman filters: applications to online machine learning of chaotic dynamics** Marc Bocquet, Quentin Malartic, Alban Farchi CEREA joint laboratory Ecole des Ponts ParisTech and EdF R&D, France	
14:15-14:45	**High-resolution Ensemble Kalman Filter with a low-resolution model using a machine learning super-resolution approach** Sébastien Barthélémy[1,2], Julien Brajard[3], Laurent Bertino[3] [1]University of Bergen, Norway; [2]Bjerknes Center for Climate Reserch, Norway; [3]NERSC, Norway	
14:45-15:15	**DAPPER: Data Assimilation with Python: a Package for Experimental Research** Patrick N. Raanes NORCE, Norway	Session chair: Kristian Fossum, NORCE
15:15-15:45	**A new framework for elastic ensemble-based data assimilation at large-scale** Sebastian Friedemann, Bruno Raffin INRIA, France	
15:45-16:15	**Optimal assimilation of SEVIRI Water Vapor Channels With an LETKF** Axel Hutt[1], Roland Potthast[2] [1]INRIA, France; [2]DWD, Germany	Session chair: Yue Ying, NERSC
16:15-16:45	**Assimilating surface moisture satellite images into a coupled and spatialized water quality model: strategies and challenges** Emilie Rouzies[1], Claire Lauvernet[1], Arthur Vidard[2] [1]INRAE, France; [2]INRIA, France	
16:45-17:15	**Shape-Oriented Sensitivity Analysis and Data Assimilation for Wildland Fire Applications** Mélanie C. Rochoux[1], A. Collin[2], A. Costes[1,3], C. Zhang[4], A. Trouvé[4], D. Lucor[5], P. Moireau[2] [1]CERFACS, France; [2]INRIA, France; [3]CNRM, France; [4]University of Maryland, USA; [5]LISN, France	
17:15-17:45	**A parallel update step of a sampling-free EnKF-type filter** Philippe Bisaillon[1], Ajit Desai[1], Mohammad Khalil[2], Chris Pettit[3], Dominique Poirel[4], Abhijit Sarkar[1] [1]Carleton University, Canada; [2]Sandia National Laboratories, USA; [3]United States Naval Academy, USA; [4]Royal Military College of Canada, Canada	Session chair: Yue Ying, NERSC
17:45-18:15	**EnKF-based estimation of CO surface fluxes using simulated observations during summer 2015** Vikram Khade[1,2], Saroja Polavarapu[1,2], Michael Neish[1], Dylan Jones[2], Pieter Houtekamer[1], Seung-Jong Baek[1] [1]Environment and Climate Change Canada, Canada; [2]University of Toronto, Canada	
18:15-18:45	**Assimilation of aerosol optical depth retrievals using ensemble Kalman filter to improve aerosol forecasts** Bo Huang[1,2], Mariusz Pagowski[1,2], Cory Martin[3], Samuel Trahan[1,2], Andrew Tangborn[3], Daryl Kleist[3], Shobha Kondragunta[4], Sergey Frolov[1,2] [1]University of Colorado Boulder, USA; [2]NOAA/ESRL/GSL, USA; [3]NOAA/NWS/NCEP, USA; [4]NOAA/NESDIS/STAR, USA	

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Wednesday 09/06/2021

13:00-13:30	**Multivariate Ensemble Sensitivity Analysis for Understanding the Dynamics of Convective Events** Govindan Kutty, Babitha George Indian Institute of Space Science and Technology, India	Session chair: Laurent Bertino, NERSC
13:30-14:00	**A data assimilation approach for the estimation of mantle viscosities from paleo sea level observations** Reyko Schachtschneider[1], Jan Saynisch-Wagner[1], Volker Klemann[1], Meike Bagge[1], Maik Thomas[1,2] [1]Helmholtz-Centre Potsdam GFZ, Germany; [2]Freie Universität Berlin, Germany	
14:00-14:30	**Ocean biogeochemical model parameter uncertainties: Application of ensemble data assimilation to a one-dimensional model** Nabir Mamnun[1], Lars Nerger[1], Christoph Völker[1], Mihalis Vrekoussis[2] [1]Alfred Wegener Institute, Germany; [2]University of Bremen, Germany	
14:30-15:00	**A multiscale alignment method for ensemble filtering applied to hurricane and sea ice models** Yue Ying[1], Jeffrey L. Anderson[2], Laurent Bertino[1] [1]NERSC, Norway; [2]NCAR, USA	Session chair: Trond Mannseth, NORCE
15:00-15:30	**Parameter estimation and Optimal sensor placement for Data Assimilation problems** Louis Sharrock, Nikolas Kantas Imperial College London, UK	
15:30-16:00	**Using the Iterative Ensemble Kalman Smoother for Seismic Waveform Inversion** Michael Gineste, Jo Eidsvik Norwegian University of Science and Technology (NTNU), Norway	Session chair: Geir Nævdal, NORCE/UiS; Kjersti Eikrem, NORCE
16:00-16:30	**Improving earthquake occurrences estimation using an ensemble Kalman smoother: a synthetic experiment** Hamed Diab-Montero[1], Meng Li[2], Ylona van Dinther[2], Femke C. Vossepoel[1] [1]Delft University of Technology, the Netherlands; [2]Utrecht University, the Netherlands	
16:30-17:00	**Assimilation of conventional and satellite observations in a deep convection case during RELAMPAGO using the WRF-GSI-LETFK system** Paola Corrales[1,2,3], Juan Ruiz[1,2,3], Victoria Galligani[1,2,3], Maximiliano Sacco[2,4], Luiz Sapucci[5], María Eugenia, Dillon[3,4], Yanina García Skabar[3,4], Stephen Nesbitt[6] [1]CONICET-UBA-CNRS, Argentina; [2]FCEyN, UBA, Argentina; [3]CONICET, Argentina; [4]Servicio Meteorológico Nacional, Argentina; [5]National Institute for Space Research, Brazil; [6]University of Illinois, USA	
17:00-17:45	**Ensemble based data assimilation via a modified Cholesky decomposition** Elias D. Niño-Ruiz Universidad del Norte, Colombia	Session chair: Geir Evensen, NORCE/NERSC
17:45-18:15	**Bayesian data assimilation for patient-specific aorta dissection using bifidelity computational fluid dynamic simulation** Pan Du, Jian-xun Wang University of Notre Dame, USA	
18:15-18:45	**A fast, single-iteration ensemble Kalman smoother for online, sequential data assimilation** Colin Grudzien[1], Marc Bocquet[2,3] [1]University of Nevada; [2]CEREA, France; [3]Université Paris-Est, France	

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Thursday 10/06/2021

13:00-13:30	**Ensemble Kalman Inversion: regularization, convergence and localization** Xin Tong[1], Andrew Stuart[2], Neil Chada[3], Matti Morzfeld[4] [1]National University of Singapore, Singapore; [2]Caltech, USA; [3]KAUST, Saudi Arabia; [4]UCSD, USA	Session chair: Trond Mannseth, NORCE
13:30-14:00	**Regularization of the ensemble Kalman filter with constrained non-stationary convolutions** Michael Tsyrulnikov, A. Sotskiy, D. Gayfulin HydroMetCenter of Russia, Russia	
14:00-14:30	**Novel iterative ensemble smoothers derived from a class of generalized cost functions** Xiaodong Luo NORCE, Norway	
14:30-15:00	**Model probabilities and hierarchical modeling** Kristian Fossum, Sigurd I. Aanonsen, Trond Mannseth NORCE, Norway	Session chair: Geir Evensen, NORCE/NERSC
15:00-15:30	**Derivative-free Bayesian Inversion Using Multiscale Dynamics** Grigorios Pavliotis[1], Andrew Stuart[2], Urbain Vaes[3] [1]Imperial College London, UK; [2]Caltech, USA; [3]Inria, France	
15:30-16:00	**A p-kernel Stein variational gradient descent algorithm with applications to data assimilation** Andreas S. Stordal[1], R.J. Moraes[2], P. Nima Raanes[1], G. Evensen[1,3] [1]NORCE, Norway; [2]Petrobras, Brazil; [3]NERSC, Norway	Session chair: Rolf Lorentzen, NORCE
16:00-16:30	**Comparison of ensemble-based data assimilation techniques for epidemiological forecasting and parameter estimation in an age-based compartmental SEIR model** Juan Ruiz[1,2], Santiago Rosa[3], Tadeo Cocucci[3,4], Manuel Pulido[2,4] [1]Universidad de Buenos Aires, Argentina; [2]UMI-IFAECI/CNRS-CONICET-UBA, Argentina; [3]Universidad Nacional de Córdoba, Argentina; [4]Universidad Nacional del Nordeste, Argentina	
16:30-17:00	**Ensemble-based data assimilation for epidemiological agent based models** Tadeo J. Cocucci[1,4], Manuel Pulido[1,2], Juan Ruíz[2,3], Santiago Rosa[4] [1]Universidad Nacional del Nordeste, Argentina; [2]UMI-IFAECI/CNRS-CONICET-UBA, Argentina; [3]Universidad de Buenos Aires, Argentina; [4]Universidad Nacional de Córdoba, Argentina	
17:00-17:45	**Data assimilation in hydrology and streamflow forecasting** Moha Gharamti UCAR, USA	Session chair: Andreas Stordal, NORCE
17:45-18:15	**A Multiscale Local Gain Form Ensemble Transform Kalman Filter (MLGETKF)** Xuguang Wang[1], Hristo G. Chipilski[1], Craig H. Bishop[2], Elizabeth Satterfield[3], Nancy Baker[3], Jeffrey S. Whitaker[4] [1]University of Oklahoma, USA; [2]University of Melbourne, Australia; [3]Naval Research Laboratory, USA; [4]NOAA, USA	
18:15-18:45	**Coupled Thermosphere-Ionosphere Modeling of Global Neutral Densities Using Assimilated COSMIC Radio Occultation Data** Nicholas Dietrich[1], Tomoko Matsuo[1], Chih-Ting Hsu[2] [1]University of Colorado Boulder, USA; [2]NCAR, USA	

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Friday 11/06/2021

13:00-13:45	**Ensemble based reservoir management for the people** Markus F. Dregi Equinor, Norway	Session chair: Andreas Stordal, NORCE
13:45-14:15	**Digital Integrative Model Development for Reservoir Production Management** Anastasia G. Mukhina Gubkin Russian State University of Oil and Gas, Russia	
14:15-14:45	**Selecting Relevant Fractures for Data Assimilation with Ensemble Kalman Filters in Fractured Reservoirs** Michael Liem[1], Stephan K. Matthai[2], Patrick Jenny[1] [1]ETH Zürich, Switzerland; [2]The University of Melbourne, Australia	
14:45-15:15	**A generalisation of the updating step in EnKF** Håkon Tjelmeland, Margrethe K. Loe Norwegian University of Science and Technology (NTNU), Norway	Session chair: Geir Nævdal, NORCE/UiS
15:15-15:45	**Assessment of correlation-based localization techniques** Kristian Fossum NORCE, Norway	
15:45-16:15	**Data-driven computational simulation of tumor progression: characterization of tumor microenvironment using ES-MDA** Jahn Otto Waldeland[1], Geir Nævdal[1,2], Steinar Evje[1] [1]University of Stavanger, Norway; [2]NORCE, Norway	Session chair: Rolf Lorentzen, NORCE
16:15-16:45	**Deep learning surrogate-assisted assimilation of image-type data** Cong Xiao[1], Olwijn Leeuwenburgh[2,3], Arnold Heemink[2], Hai Xiang Lin[2] [1]China University of Petroleum, Beijing; [2]Delft University of Technology, the Netherlands; [3]TNO, the Netherlands	
16:45-17:15	**Data Assimilation by Ensemble Kalman Filter and Neural Networks Applied to Global Atmospheric Models** Haroldo F. de Campos Velho[1], Rosangela C. S. Cintra[1], Steven Cocke[2] [1]National Institute for Space Research, Brazil; [2]Florida State University, USA	
17:15-17:45	**Regularized ensemble Kalman methods for inverse problems** Xinlei Zhang, Carlos Michelén-Ströfer, Heng Xiao Virginia Tech, USA	Session chair: Xiaodong Luo, NORCE
17:45-18:15	**Nonlinear sparse Bayesian learning using EnKF based state estimator** Brandon Robinson[1], Philippe Bisaillon[1], Rimple Sandhu[1], Mohammad Khalil[2], Chris Pettit[3], Dominique Poirel[4], Abhijit Sarkar[1] [1]Carleton University, Canada; [2]Sandia National Laboratories, USA; [3]United States Naval Academy, USA; [4]Royal Military College of Canada, Canada	
18:15-18:45	**Unscented Kalman Inversion** Daniel Z. Huang, Tapio Schneider, Andrew M. Stuart Caltech, USA	

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