The 9th Workshop on Adjoint Model Applications In Dynamic Meteorology

Cefalu, Sicily, Italy
10-14 October 2011

Sponsored by
NASA's Global Modeling and Assimilation Office

Chief Organizer: Ronald Errico (GMAO and GESTAR)

Organizing committee:
Susan Ballard (Met-Office)
Jan Barkmeijer (KNMI)
Mark Buehner (Environment Canada)
Carla Cardinali (ECMWF)
Gerald Desroziers (Meteo-France)
Marta Janiskovs (ECMWF)
Nikki Privé (GMAO and GESTAR)
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PROGRAM & PARTICIPANT LIST

If a presentation has multiple authors affiliated with the same institution, that institution is indicated only once. If an author has multiple affiliations, only the primary one is indicated. A presentation number in bold italics indicates a long (invited) talk. All times are tentative.

Session 0			
Sunday	**Pre-Workshop Tutorials**		**9 Oct 2011**
0930	**Ronald Errico**	0.1	Fundamentals of Adjoint Models
1200	Lunch		
1330	**Andrew Lorenc**	0.2	Fundamentals of Data Assimilation
1500	Close of Tutorial Session		

Session 1			
Monday Morning			**10 Oct 2011**
			Session Chair: Liang Xu
0830	**Ronald Errico**		Welcoming remarks and announcements
Adjoint Development			
0845	**Marta Janiskova** Carla Cardinali	1.1	Forecast error contribution of the global observing system using different energy norms and different representation of physical processes in the adjoint model
0910	**Cristina L. Charlton-Perez** S. P. Ballard, Z. Li, D. Simonin, H. Buttery, N. Gaussiat, L. Hawkness-Smith	1.2	Adapting the UKMO linear model for NWP-based nowcasting
0935	**Tim Payne**	1.3	Accounting for linearisation error in the Extended Kalman Filter and 4D-Var
1000	Roel Stappers **Jan Barkmeijer**	1.4	Optimal linearization trajectories
1025	Break		
1045	**Adrian Sandu**	1.5	Properties of discrete adjoints for adaptive models
1110	**Patrick E. Farrell** S. W. Funke	1.6	A high-level abstraction for developing adjoint models
Sensitivity Analysis			
1135	**Brett Hoover**	1.7	Dynamical sensitivity analysis of tropical

	Michael Morgan		cyclogenesis: a barotropic mode in the eastern Pacific
1200	**Michael C. Morgan**	1.8	An adjoint description of geostrophic adjustment
1300	Lunch		

Session 2			
Monday Afternoon			**10 Oct 2011**
			Session Chair: Marta Janiskova
1430	**Patrick Heimbach** Martin Losch	2.1	Sensitivity patterns of sub-ice shelf melt rates to ocean circulation under Pine Island Glacier from an adjoint ocean general circulation model
1455	**Brian Ancell** Lynn McMurdie Rolf Langland	2.2	The predictability of North American land-falling cyclones
1520	**Colette Kerry** Brian Powell	2.3	Quantifying the sensitivity of nonlinear tides in the Philippine Sea
1545	Oger N., **Olivier Pannekoucke** Doerenbecher, A. Arbogast, P	2.4	Sensitivity of the KFS to the trajectory of reference
1610	Break		
Observation Operators			
1630	**Alain Caya** Mark Buehner Michael Ross Tom Carrieres	2.5	Challenges of assimilating observations for producing high-resolution sea-ice analyses
1655	**Steven J. Fletcher** Glen E. Liston Christopher A. Hiemstra Steven D. Miller	2.6	Assimilation of MODIS and AMSR-E Snow Parameter Observations into a Physical Snow Model
1720	**Zhiquan Liu** Quanhua Liu Hui-Chuan Lin Craig Schwartz	2.7	Variational assimilation of MODIS aersosol optical depth over east Asia region
1745	**Martin Leutbecher**	2.8	On ensemble forecasts, singular vectors and reliability

Session 3

Tuesday Morning **11 Oct 2011**

Session Chair: Gerald Desroziers

	Error Formulations		
0900	**Andrew Moore** Hernan Arango Gregoire Broquet	3.1	Estimates of analysis error, forecast error, and predictability derived from the adjoint of 4D-Var
0925	**Dr. Yann Michel**	3.2	Estimating deformations of random processes for correlation modeling in data assimilation
0950	**Ricardo Todling**	3.3	A smoother-based strategy to estimate system error covariances
1015	**Joanne A. Pocock** A. S. Lawless S. L. Dance N. K. Nichols	3.4	Errors of representativity
1040	Break		
1100	**Chiara Piccolo** Mike Cullen	3.5	Adaptive mesh method in the Met Office variational data assimilation system
1125	**Thibaut Montmerle** Loik Berre	3.6	Use of heterogeneous background error covariances accounting for precipitations at convective scale
1150	**Stefano Migliorini**	3.7	Information-based localization for ensemble data assimilation
	Variational DAS		
1215	**Xin Zhang** Xiang-Yu Huang Nils Gustafsson	3.8	Control of lateral boundary conditions in WRF 4D-Var
1300	Lunch		

Session 4

Tuesday Afternoon **11 Oct 2011**

Session Chair: Ronald Gelaro

Variational DAS

1430	**Amal El Akkraoui** Ricardo Todling Yannick Tremolet	4.1	Using a Bi-Conjugate Gradient minimization algorithm for variational data assimilation
1455	M.A. Freitag **Nancy K. Nichols** C.J. Budd	4.2	Resolution of sharp fronts in the presence of model error using L1-regularized variational assimilation
1520	**Joanna S. Pelc** Ehouarn Simon Laurent Bertino Ghada El Serafy Arnold W. Heemink	4.3	Model-reduced 4D-Var data assimilation in application to 1D ecosystem model
1545	Serge Gratton **Selime Gurol** Philippe Toint	4.4	Preconditioning of conjugate-gradients in observation space with an application to 4D-Var data assimilation
1610	Break		
1610	**Poster Session**		
	Loik Berre Gerald Desroziers Laure Raynaud Hubert Varella Laurent Descamps Carole Labadie	4.5	Variational ensemble data assimilation at Meteo-France for error covariance modelling and ensemble prediction
	Vanja Blazica Nedjeljka Zagar	4.6	Quantification of divergence in a mesoscale model
	Jean-François Caron	4.7	How to optimally treat large scale information in limited area ensemble-based data assimilation?
	Dan Holdaway Ron Errico	4.8	Jacobians of the GEOS5 Relaxed Arakawa-Schubert convection scheme
	Erin Kashawlic Brian Ancell	4.9	Comparing observation impact on low-level wind forecasts between an ensemble Kalman filter and a 3DVAR data assimilation scheme
	Benjamin Menetrier Thibaut Montmerle Loik Berre Yann Michel	4.10	Variational ensemble-based forecast error variance maps filtering, a toy-models approach
	Tamas Prager Éva König	4.11	On the possibilities and limits of direct physical interpretation and synoptical

Fanni Kelemen		use of mathematical objects related to the adjoint hydro-thermodynamical equations
Tom Rosmond Craig Bishop Dave Kuhl Liz Satterfield	4.12	Balanced Ensemble Localization with Normal Mode Initialization
Elizabeth Satterfield Craig H. Bishop David D. Kuhl Tom Rosmond	4.13	Deriving optimal weights for combining static and flow-dependent covariance models
Kevin Smith	4.14	TBD
Polly Smith Andrew Moore	4.15	Application of weak constraint dual formulation 4D-Var to the California Current System
Julius Sumihar Martin Verlaan Stef Hummel Nils van Velzen	4.16	File-based model connections for data-assimilation with OpenDa
Xudong Sun Peter Steinle	4.17	4-Dvar spectral covariance with horizontal anisotropic transformation
Olivier Titaud Jean-Michel Brankart Jacques Verron	4.18	On the use of Lagrangian Coherent Structures in direct assimilation of ocean tracer images
Hubert Varella Loik Berre Gerald Desroziers	4.19	Modelling of flow-dependent ensemble-based background error correlations using a wavelet formulation
Martin Verlaan Julius Sumihar	4.20	Ensemble based observations sensitivity applied to storm surge forecasting

Session 5

Wednesday Morning			**12 Oct 2011**
			Session Chair: Jan Barkmeijer
	Particle Filters		
0900	**Peter Jan van Leeuwen**	***5.1***	Introduction to particle filters (tentative)
0950	**Melanie Ades** Peter Jan van Leeuwen	5.2	Particle filters for large-dimensional problems
1015	**Anne Cuzol** Etienne Mémin	5.3	Image assimilation with the weighted ensemble Kalman filter
1040	Break		
	Model Error		
1100	**Yannick Tremolet**	5.4	Towards a longer 4D-Var assimilation window
1125	**Carla Cardinali** Roberto Buizza Gabor Radnoti Nedjeljka Zagar	5.5	Representing model error in Ensemble Data Assimilation
1150	**Laure Raynaud** Loik Berre Gerald Desroziers	5.6	Accounting for model error in global and regional ensemble data assimilation systems
1215	**Nedjeljka Zagar**	5.7	Comparison of balance and flow-dependency of large-scale background-error variances in two ensembles
1300	Lunch		

Wednesday Afternoon	**12 Oct 2011**
Free time (weather permitting)	
1830	Dinner

Session 6

Wednesday Evening			**12 Oct 2011**
			Session Chair: Mark Buehner
2000	**Dale Barker**	***6.1***	TBD

Session 7

Thursday Morning **13 Oct 2011**

Session Chair: Andrew Lorenc

	Ensemble DAS		
0900	**Gerald Desroziers** Loik Berre	7.1	Accelerating and parallelizing minimizations in ensemble and deterministic variational assimilation
0925	**Lisa Neef** Katja Matthes	7.2	Assimilation of Earth Rotation Parameters into an Atmosphere Model
0950	**Tijana Janjic** L.Nerger A. Albertella J.Schroeter S. Skachko	7.3	Domain localization in ensemble based Kalman filter algorithms
1015	**Mohamad El Gharamti** U. Altaf I. Hotiet A. W. Heemink	7.4	Data assimilation into groundwater contaminant models using an ensemble variational approach
1040	Break		
	Hybrid Techniques		
1100	Adam Clayton Dale Barker Neill Bowler Peter Jermey **Andrew Lorenc** Rick Rawlins Mike Thurlow	7.5	The Met Office's hybrid ensemble-4D-Var scheme
1125	**David D. Kuhl** Tom Rosmond Craig H. Bishop Elizabeth Satterfield	7.6	Which matters more in Hybrid Ensemble 4D-VAR, variances or correlations?
1150	**Craig H. Bishop** Elizabeth Satterfield David D Kuhl Tom Rosmond	7.7	Errors in ensemble-based error covariance estimates and Hybrid ensemble 4D-VAR
1215	**Mark Buehner**	7.8	A hybrid variational-EnKF data assimilation technique for operational global NWP
1240	Lunch		

Session 8

Thursday Afternoon **13 Oct 2011**

Session Chair: Nikki Privé

Hybrid Techniques			
1430	Hajoon Song **Ibrahim Hoteit** Bruce Cornuelle Aneesh Subramanian	8.1	An adjoint-based adaptive ensemble Kalman filter
1455	**Ruth Petrie** Ross Bannister	8.2	High resolution dynamic data assimilation
1510	**Paul Krause** Pedro L.S. Dias	8.3	On the influence sampling of atmospheric microstates
Other Data Assimilation			
1535	**Anthony Weaver** Isabelle Mirouze	8.4	On the diffusion equation and its application to isotropic and anisotropic correlation modelling in variational assimilation
1605	Break		
1625	**Brian Powell** Bruce Cornuelle	8.5	Dealing with Nonlinearities in Data-Space Assimilation of Oceanic Flows
Observing System Simulation Experiments (OSSEs)			
1650	**Ronald Errico** Nikki Privé King-Sheng Tai	8.6	The design and validation of Observing System Simulation Experiments at NASA's Global Modeling and Assimilation Office
1715	**Nikki Privé** Ronald Errico	8.7	Observing System Simulation Experiments (OSSEs) as tools for the investigation of data assimilation systems
1740	**Daryl Kleist** John Derber David Parrish Kayo Ide Jeff Whitaker	8.8	Evaluation of a hybrid ensemble-variational data assimilation scheme using an OSSE

Session 9

Friday Morning **14 Oct 2011**

Session Chair: Carla Cardinali

Observation Impacts

0830	**Ronald Gelaro**	***9.1***	Applications of adjoint-based estimates of observation impact in NWP
0920	**Liang Xu** Wei Kang	9.2	Optimal Sensor Placement for Data Assimilations
0945	**Clark Amerault** James D. Doyle	9.3	Adjoint observation impact for a limited area model
1010	Break		
1030	**Thomas Auligné** Hongli Wang Xin Zhangs Xiaoyan Zhang Qingnong Xiao Xiang-Yu Huang	9.4	Observation Impact on Forecast Error in a Regional Model
1055	**Richard Marriott** Andrew Lorenc	9.5	Forecast-error-sensitivity to observations in the UM
1120	**Alison Fowler** Peter Jan Van Leeuwen	9.6	Measures of observation impact in non-Gaussian data assimilation
1145	**Ronald Errico**		Closing Remarks
1200	Lunch		