



Summer Graduate Workshop on Data Assimilation for the Carbon Cycle

The National Center for Atmospheric Research

Boulder, Colorado - 8-13 July, 2007

Location: Mesa Laboratory, Damon Room and Main Seminar Room, 1850 Table Mesa Drive

Sunday, 8 July 2007

1:00 Registration and Coffee

1:30 – 3:00 **Welcome and DART introduction (Damon Room)**
Jeff Anderson, NCAR Institute for Mathematics Applied to Geosciences

3:00 – 3:15 Break

3:15 – 5:00 **DART introduction (continued)**

Monday, 9 July

8:30 Coffee

8:45 **Welcome**
Al Kellie, NCAR- Director of the Computational and Information Systems Laboratory (CISL)

9:00 **Lecture 1 (Main Seminar Room)**
The Carbon Cycle
Inez Fung, University of California, Berkeley

10:15 Break

10:30 **Lecture 2 (Main Seminar)**
Data Assimilation and Forecasting the Weather
Eugenia Kalnay, University of Maryland

11:30 **Lecture 3 (Main Seminar)**
Prologue: A statistician's view of the carbon problem
Doug Nychka, NCAR- Director of the Institute for Mathematics Applied to Geosciences

12:00 – 1:30 Lunch

1:30 **Special Seminar (Main Seminar)**
Modeling for synthesis in the environmental sciences: Promise and limitations
James S. Clarke, Duke University

2:30 – 3:00 Break

3:00 – 5:00 **DART (Damon Room)**
Jeff Anderson

5:30 – 7:30 **Reception at Millennium Harvest House**

Tuesday, 10 July

8:45 Coffee

9:00 **Lecture 4 (Main Seminar)**
Carbon Sources and Sinks
Inez Fung

10:15 Break

10:30 **Lecture 5 (Main Seminar)**
Distributions, spatial statistics and a Bayesian perspective
The Likelihood, the prior and Bayes Theorem
Ancient and modern ways to evaluate the posterior
Doug Nychka

12:00 – 1:15 Lunch

1:15 **Data assimilation for transport (Damon Room)**
Jeff Anderson

2:30 **Research Vignette 1 (Damon Room)**
Data assimilation for tropospheric CO
Ave Arellano, NCAR ACD (Atmospheric Chemistry Division)

3:00 – 3:15 Break

3:15 – 5:00 **DART exercises**

5:00 Hike to Chautauqua - Downtown Boulder – Lodge
Or
Bus ride to Downtown Boulder – Walk to Lodge
Or
Bus to Lodge

Wednesday, 11 July 2007

8:45 *Coffee*

9:00 **Lecture 6 (Main Seminar)**

The Ensemble Filter and Variational Problems

Beyond Filters to Smoothers

Doug Nychka

10:15 *Break*

10:30 **Estimating parameters in DART (Damon Room)**

Jeff Anderson

12:00 – 1:15 *Lunch*

1:15 **Estimating parameters in DART (continued)**

2:30 **Research Vignette 2 (Damon Room)**

TBA

Eugenia Kalnay

3:00 – 3:15 *Break*

3:15 – 5:00 **DART exercises**

Jeff Anderson

Thursday, 12 July

8:45 Coffee

9:00 **Lecture 7 (Main Seminar)**

Observation Networks and Biogeochemical Models for CO₂
David Schimel, NCAR Climate & Global Dynamics Division (CGD)

10:15 Break

10:30 **Exercise: SIPNET Parameter estimation (Damon Room)**

David Schimel

12:00 – 1:15 Lunch

1:15 **Adaptive filters in DART (Damon Room)**

Jeff Anderson

2:30 **Research Vignette 3 (Damon Room)**

TBA

David Baker, NCAR Climate & Global Dynamics Division (CGD)

3:00 – 3:15 Break

3:15 **Research Vignette 4 (Damon Room)**

Aircraft CO₂ Observations and Global Carbon Budgeting
Britton Stephens, NCAR Earth Observing Laboratory

3:45 – 5:00 **DART Exercises (Damon Room)**

Friday, 13 July

8:45 Coffee

9:00 DART projects (Damon Room)

10:15 Break

10:30 Micro talks by participants: Lessons learned

12:00 – 1:15 Lunch

1:15 Break out groups

2:30 Reports

3:00 – 3:15 Break and closing

3:30 Workshop adjourns

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