Information Content for Observations of Forest Carbon Stocks and Fluxes when Assimilated with the DALEC Carbon Balance Model PLAN

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Introduction

Motivation for understanding the information content of observations. Important for knowing when and which observations to take to give you the most information possible about the system.

The DALEC Model

Background on DALEC model and how it is implemented in DA. State just five carbon pools, if estimating the parameters also state is approximately twenty elements.

Introduction to Variational Assimilation

For our information content measures we use a variational assimilation framework. 3DVAR/4DVAR.

Information Content Measures

A look at what information content measures are currently in use.

Shannon Information Content

explanation of what SIC is.

SIC for a Single Observation at One Time

A analytic representation of SIC for obs. at a single time. Show NEE's SIC dependence on temperature, net daily irradiance and Cf. Obs. of NEE made in summer months provide more information than those made in winter.

SIC for Successive Observations over a Time Window

Show information content when successive observations are added to our assimilation window. Begin with analytical form form successive observations of Cf. For NEE seasonal cycle still clear, if assimilation window begins in summer a higher SIC is reached over a shorter period (refer to

graph in previous section). A single observation of NEE made in summer provides the same level of information as 14 observations of NEE made in winter.

Degrees of Freedom for Signal

Backs up findings using SIC. Only observing three carbon pools with NEE does this mean max value $DOFS$ can attain is three?

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Conclusions

Summary of what we have found.