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The Optimisation InterComparison project (OptIC): development and evaluation of methods for parameter estimation in biogeochemical cycle models using remotely sensed data

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Model-data fusion is an important tool for combining remotely sensed data and models of biogeochemical cycles. Here we investigate methods for estimating parameters in biogeochemical models by the assimilation of remotely sensed data. The poster discusses the Optimisation InterComparison (OptIC) project, an international intercomparison of optimisation methods for parameter estimation in biogeochemical models funded by IGBP and the European Space Agency, and run by the Global Carbon Project (http://www.globalcarbonproject.org/ACTIVITIES/OptIC.htm). The OptIC project looks at the strengths and weaknesses of a variety of model-data fusion methods for parameter estimation (including the Kalman filter, adjoint variational, genetic algorithm). The aim is to evaluate the various methods, focussing on issues like uncertainty analysis, the effect of different noise characteristics and observability problems. These issues are explored with a highly simplified test model, with many characteristics similar to models used in real applications. Artificially generated data with added noise are provided to participants in the OptIC project, who use the method of their choice to recover the model parameters. As an example, we show results from the Kalman filter applied to this problem. We also describe application of the Kalman filter to real remote sensing data, for multi-constraint estimation of long-record water and energy balances, drawing on some of the insights gained from the synthetic OptIC project.