PNNL SBR SFA: Data Management and Assimilation

Xingyuan Chen (xingyuan.chen@pnnl.gov) - Pacific Northwest National Laboratory (PI), Glenn E. Hammond, SNL; Tim Johnson, PNNL (Co-PIs).

Management and assimilation (DMA) of diverse data sets generated from multi-scale observations, field experiments, and modeling is an integral part of the PNNL SBR SFA that cuts across all tasks. It is an essential activity to bridge multi-scale field and process model studies, and multi-scale science and modeling as proposed in PNNL's new SBR SFA Science Plan. Making data and modeling results from our SFA research available to the broader scientific community and the public is critical to advancing DOE's mission. Our DMA goals are to establish and maintain a central repository for storage and dissemination of project data sets and to improve model predictability through iteration between model conceptualization and experimental/field data. The expected products of DMA are (1) a comprehensive database that includes laboratory and field data and modeling results with linkages to the DOE PHOENIX database, BER/BSSD KBase, and the EMSL data management system and (2) a community data assimilation framework employing high performance computing and adapted for multi-scale science and modeling.

This poster illustrates representative data products generated by PNNL SBR SFA research team over the past triennial period, highlighting the use of telemetry for robust real-time data collection. This poster also demonstrates how multi-scale and multi-type data are assimilated using a Bayesian framework to characterize scale-dependent heterogeneity and reduce uncertainty in model predictions.