

Assessing the Influence of Observational Data Error on SiB 2 Model Parameter Uncertainty

9th LBA-ECO Science Team Meeting

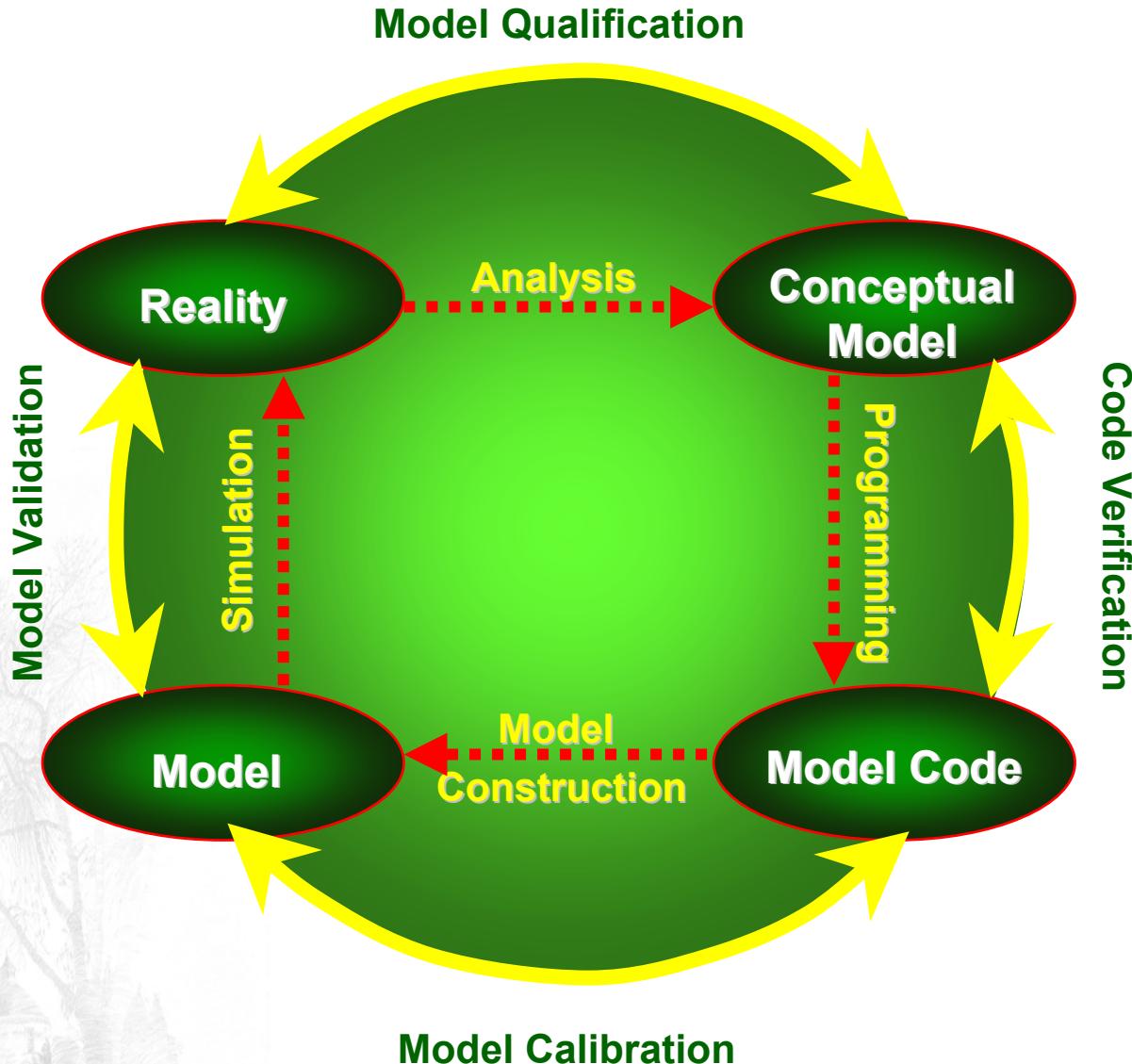
Luis A. Bastidas¹,

E. Rosero¹, S. Pande¹, W.J. Shuttleworth²

*¹Civil and Environmental Engineering and
Utah Water Research Laboratory, Logan, Utah*

*²Hydrology and Water Resources,
SAHRA – NSF Science and Technology Center
University of Arizona, Tucson, Arizona*

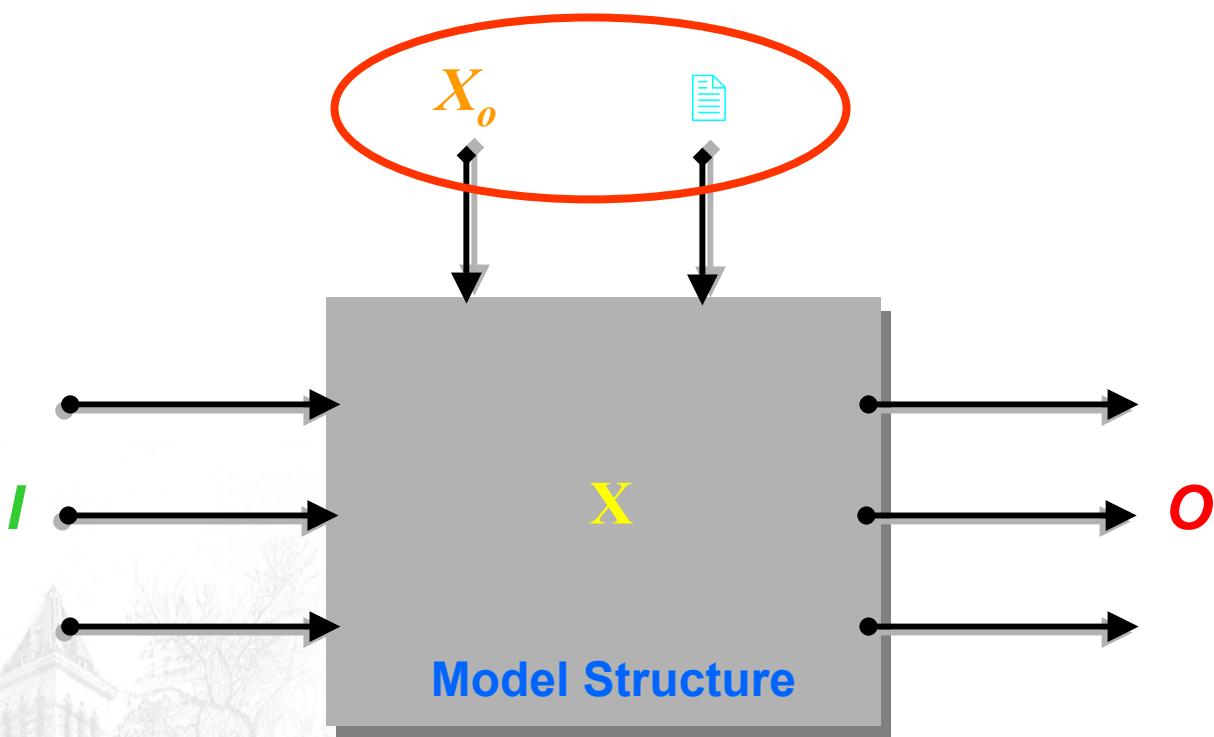




Modified from Refsgaard, 2001



Components of a Model



$$X_t = F(X_{t-1}, \theta, I_{t-1})$$

$$O_t = G(X_t, \theta, I_t)$$

Inputs

Outputs

State Variables

Model Structure

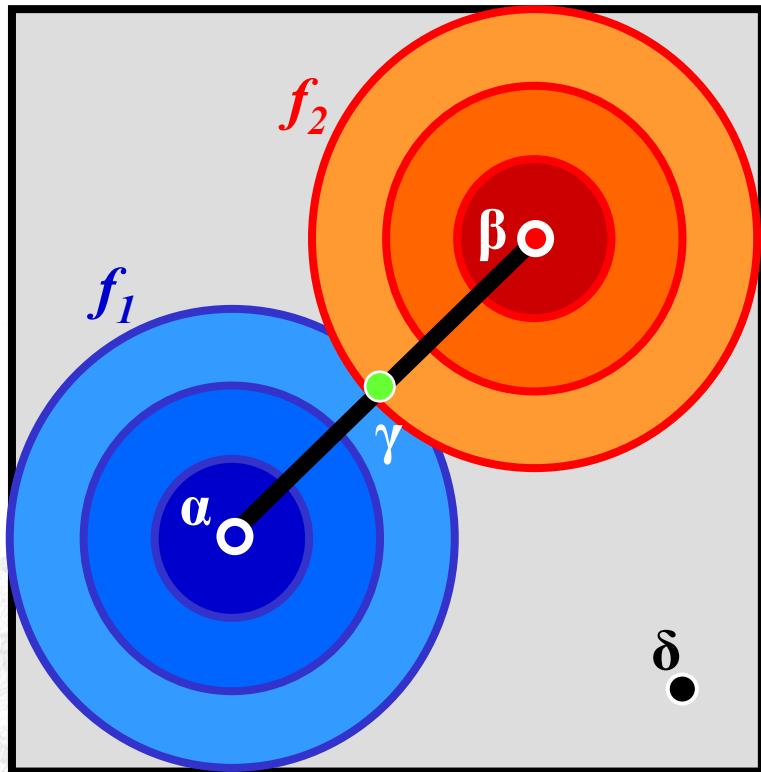
Initial States

Parameters



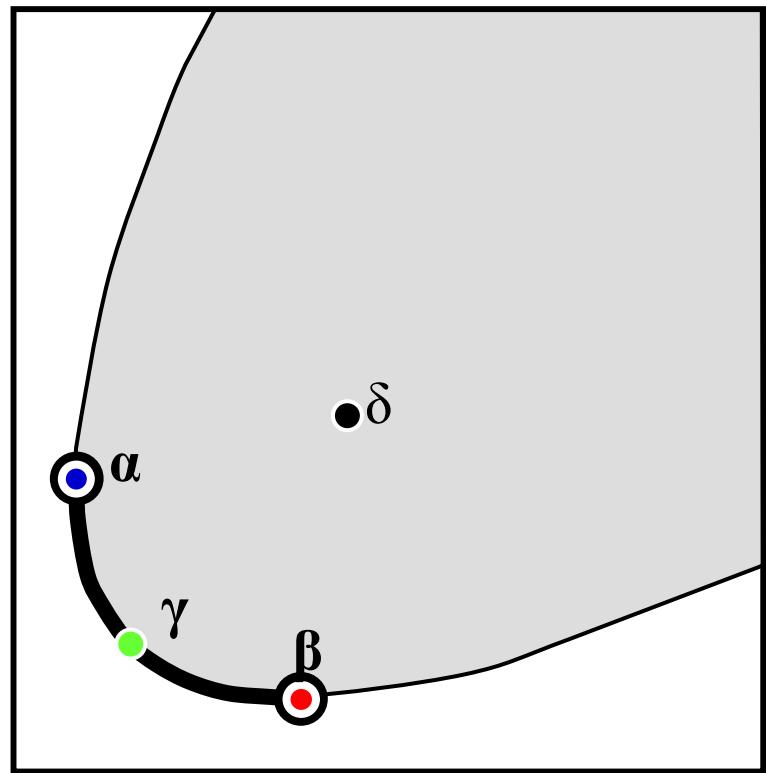
Parameter Space

Parameter θ_2



Criterion Space

Criterion f_2

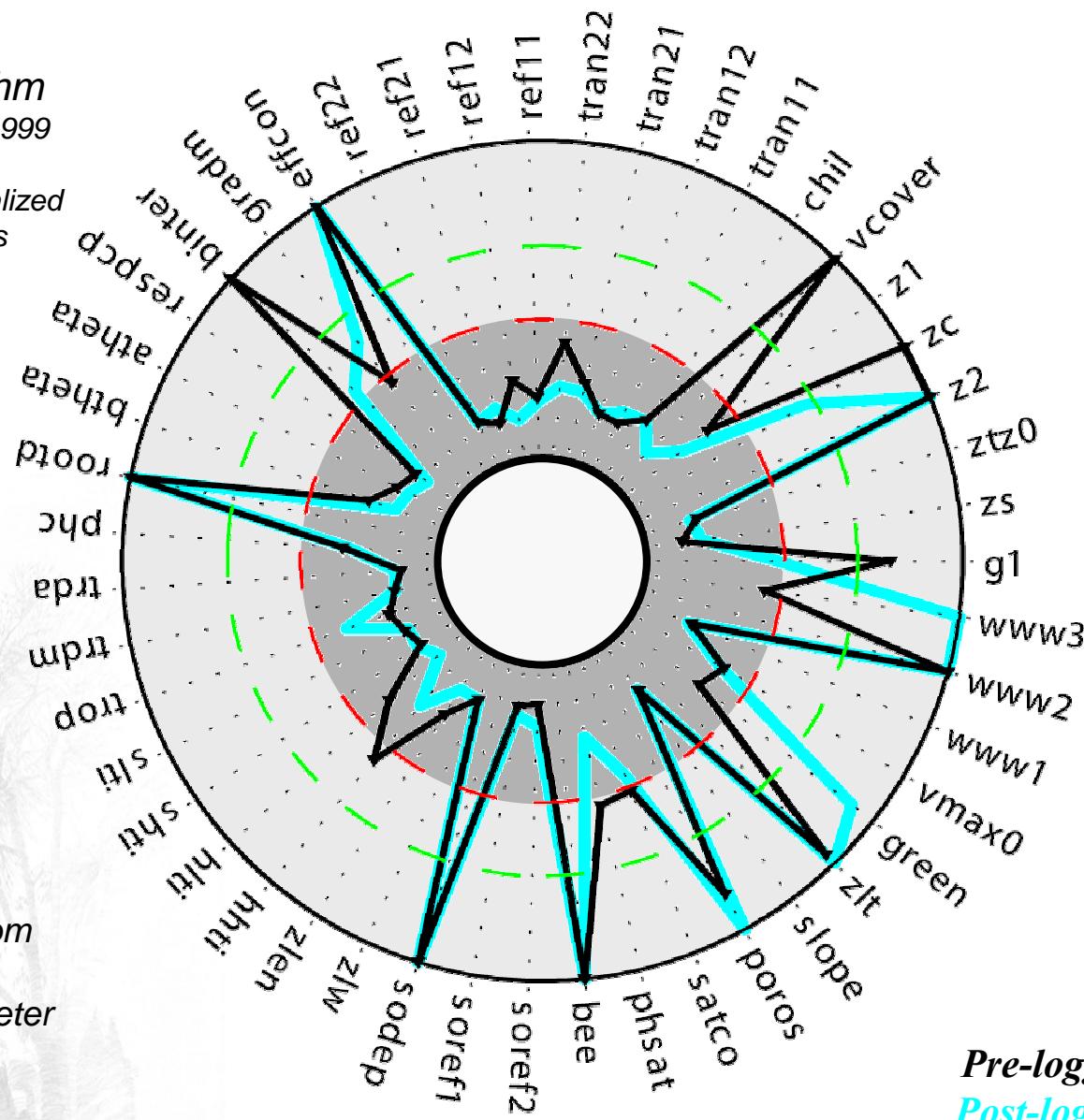


Sensitivity Analysis. SiB 2 @ Santarem Km 83

MOGSA Algorithm

Bastidas et al., JGR, 1999

Multi Objective Generalized Sensitivity Analysis

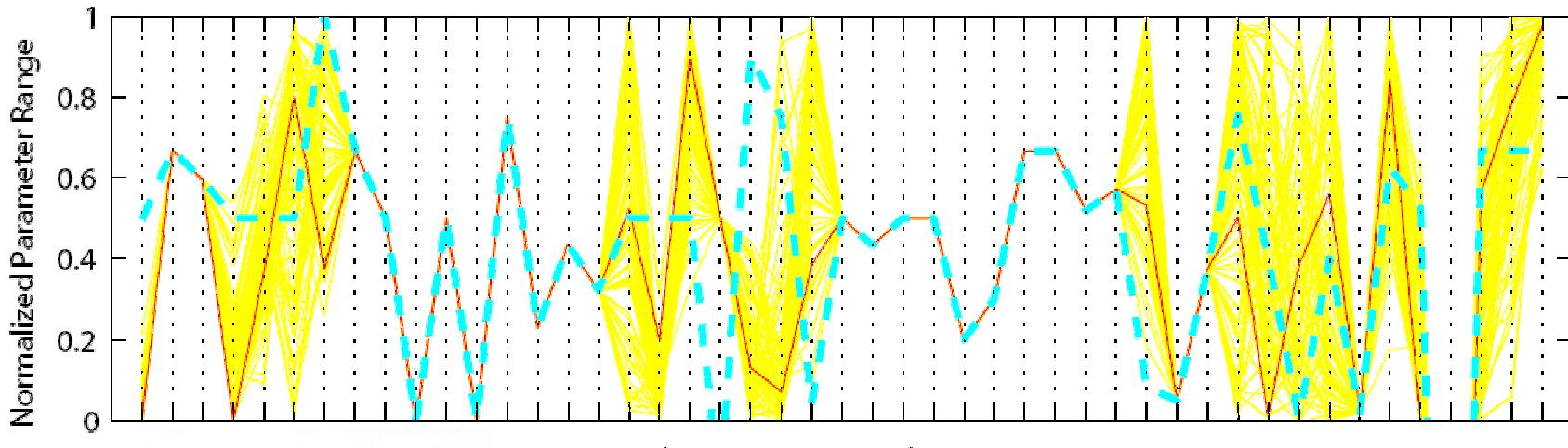


*The further away from
the center the more
sensitive the parameter*

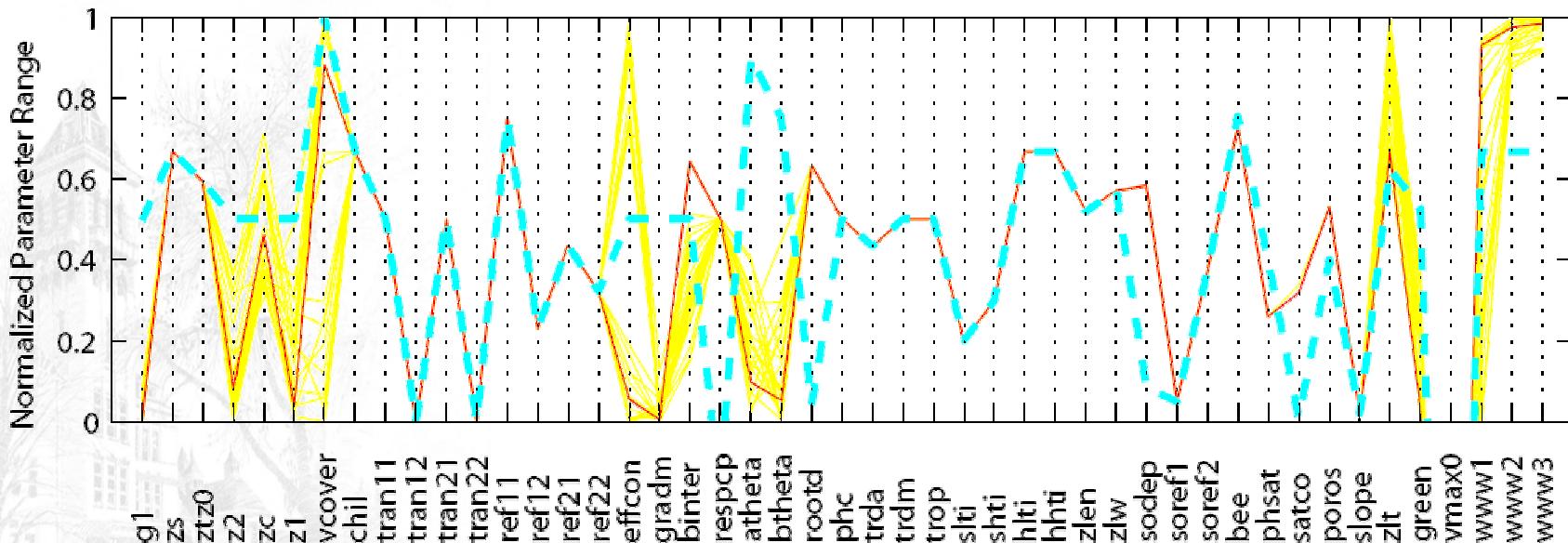
Pre-logging *Post-logging*

Pareto Set of Parameters

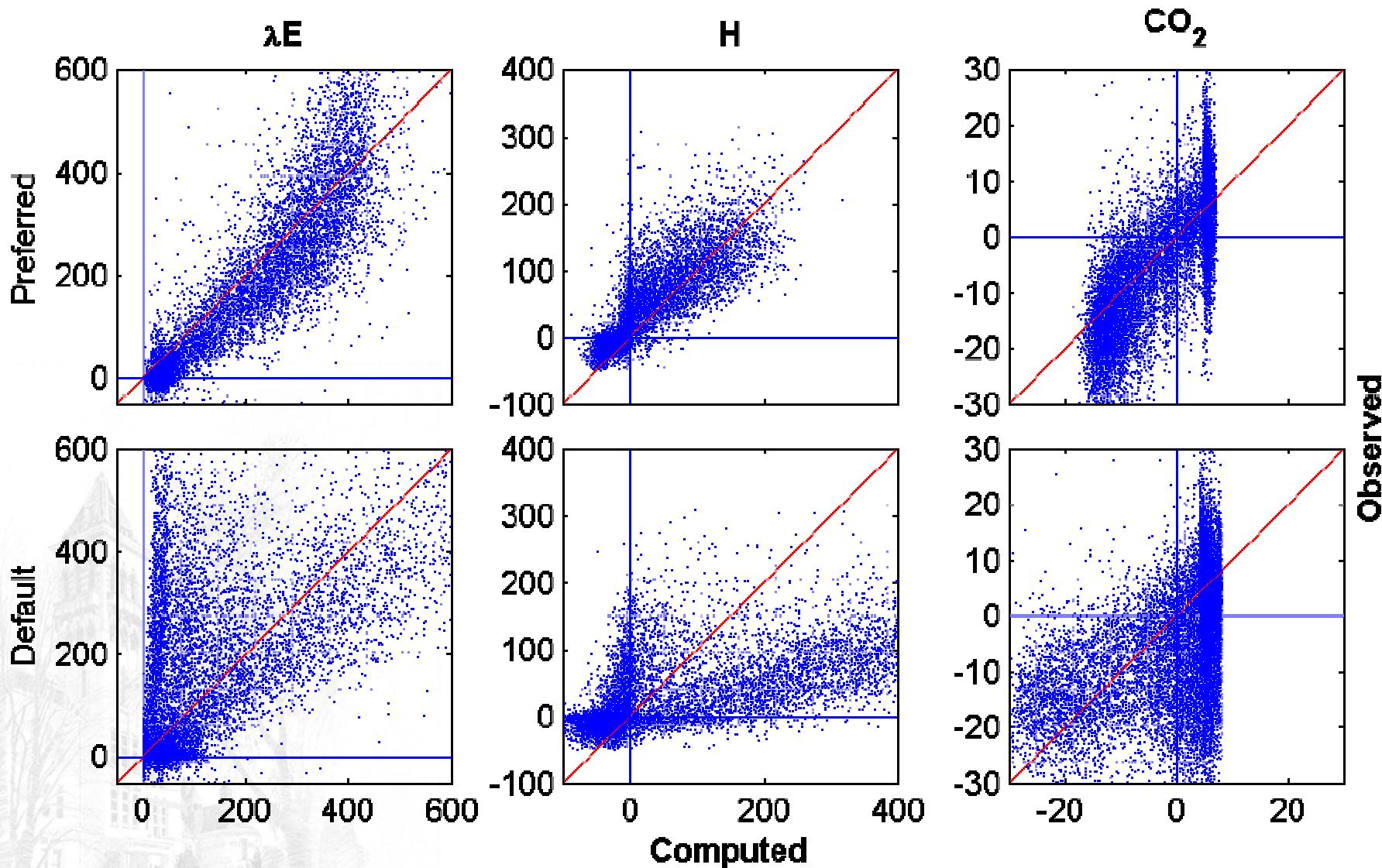
(a) Santarem Pre-logging



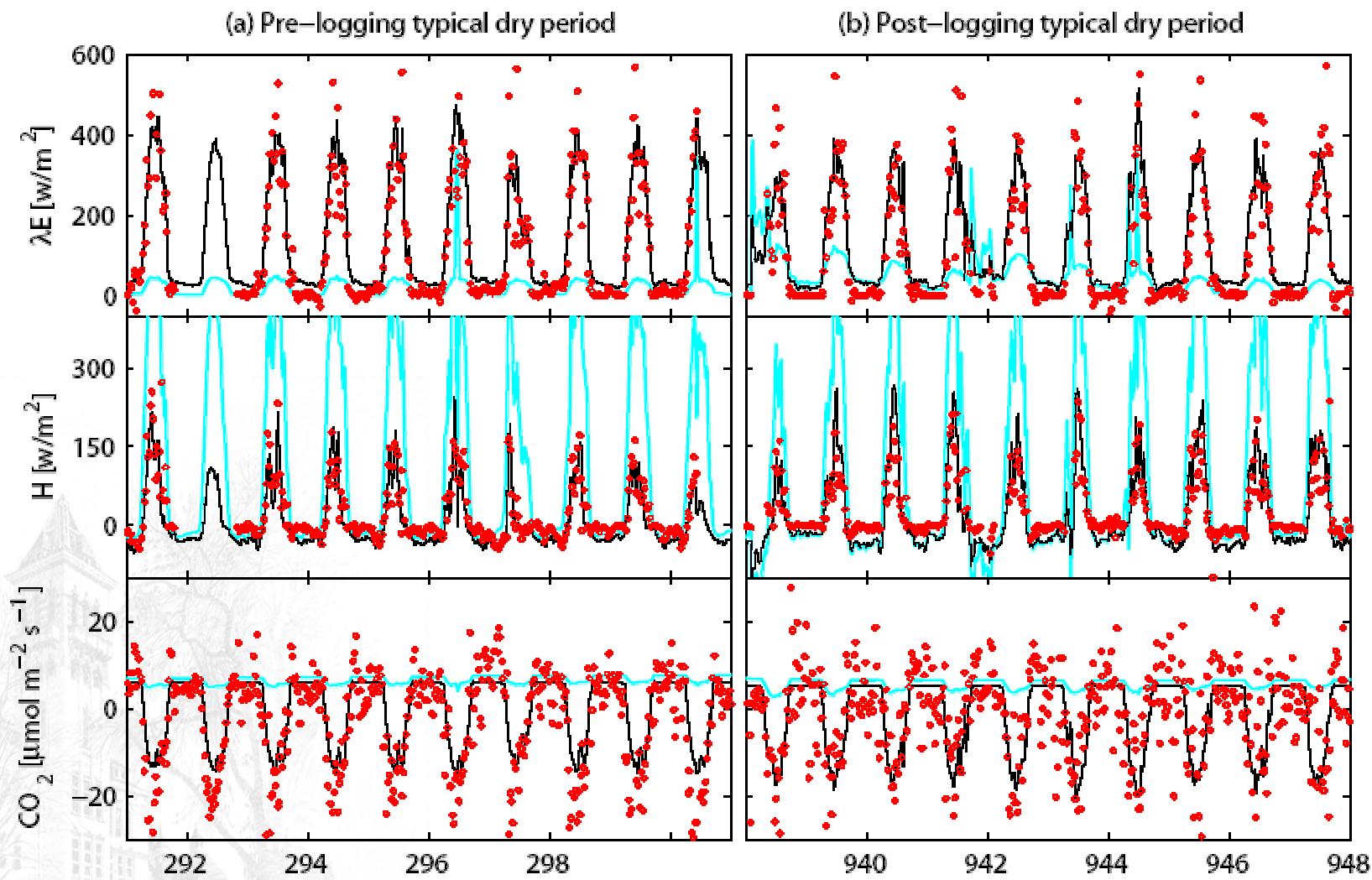
(b) Santarem Post-logging



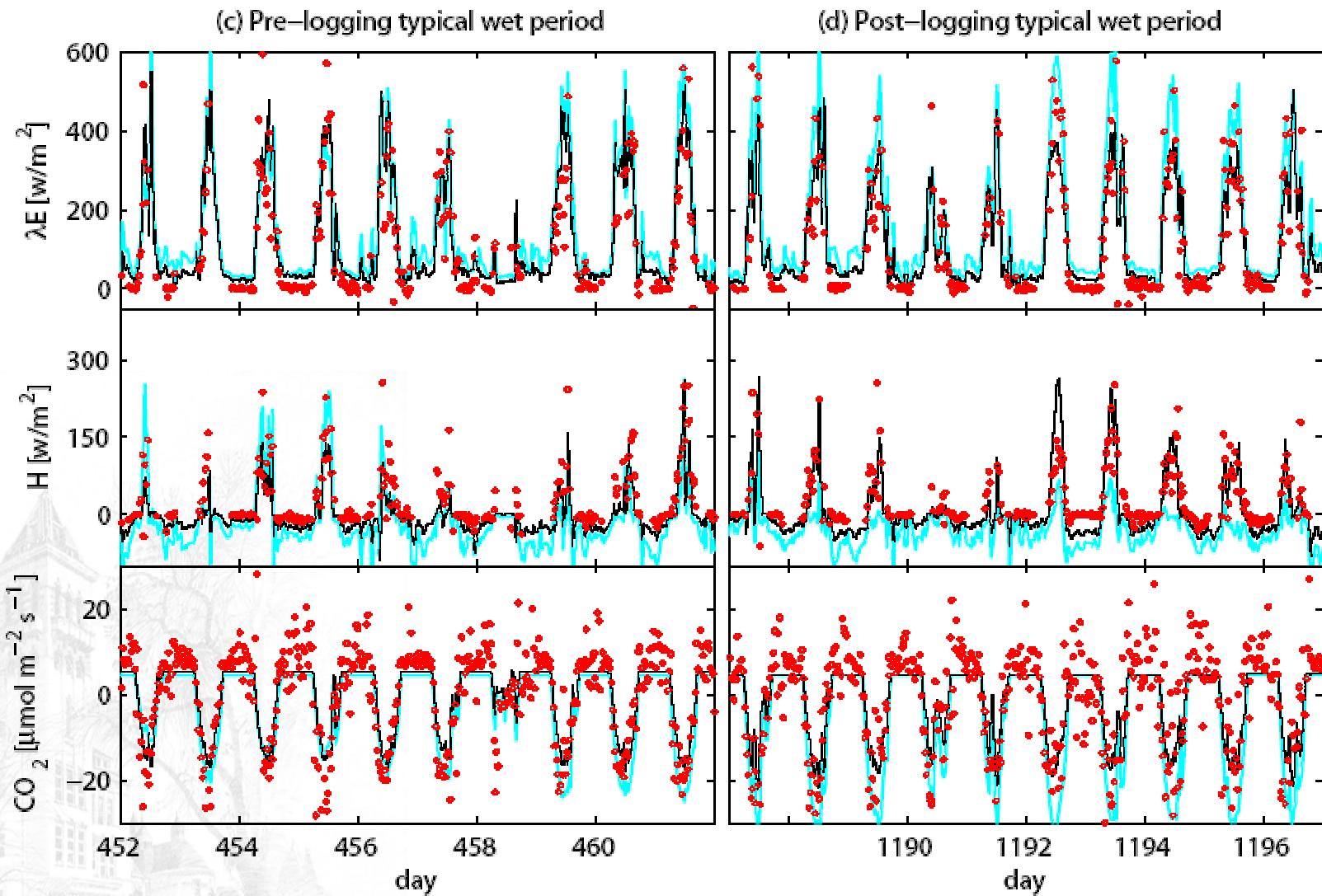
Observed vs Computed. Pre-logging

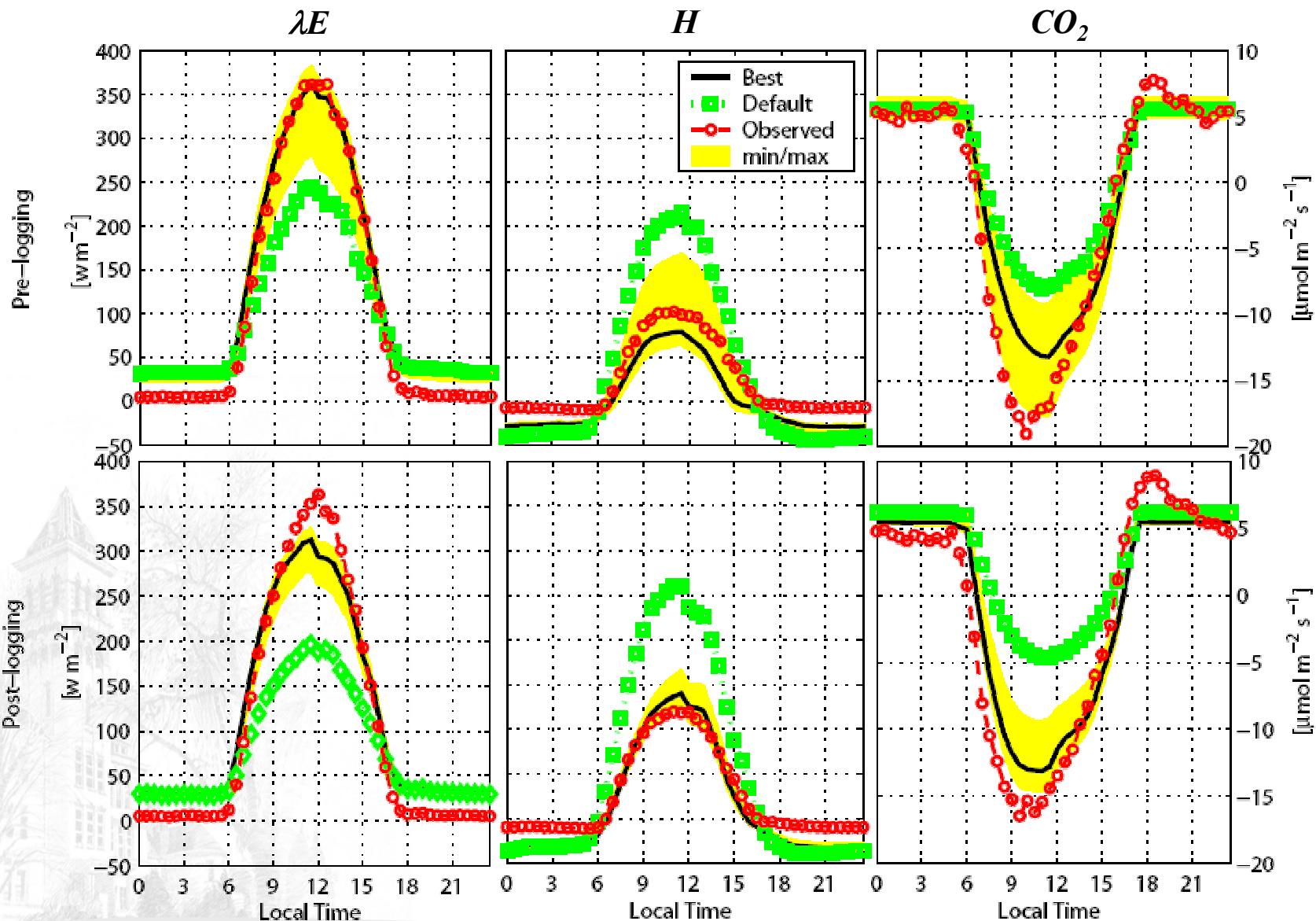


Dry Typical Periods

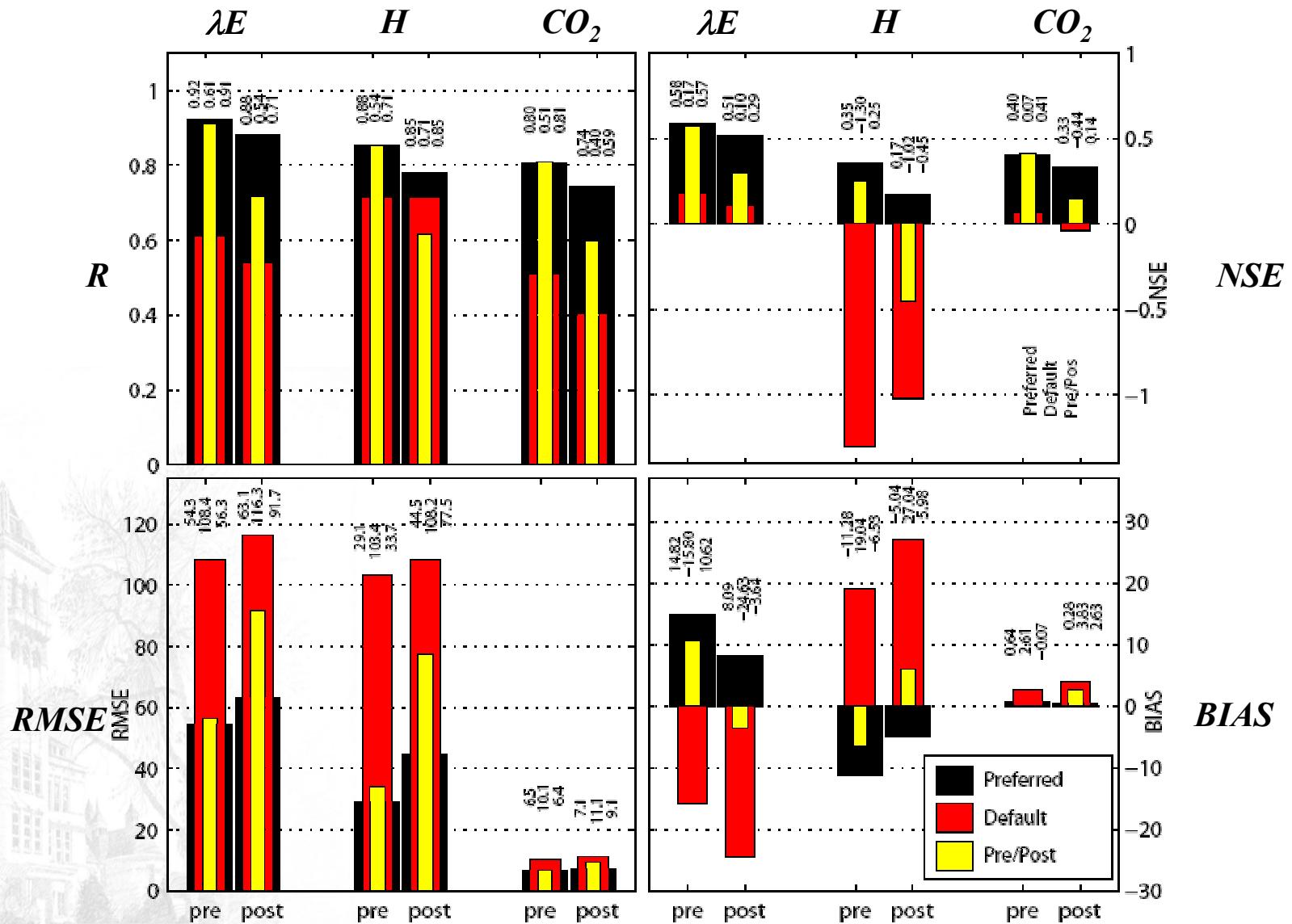


Wet Typical Periods





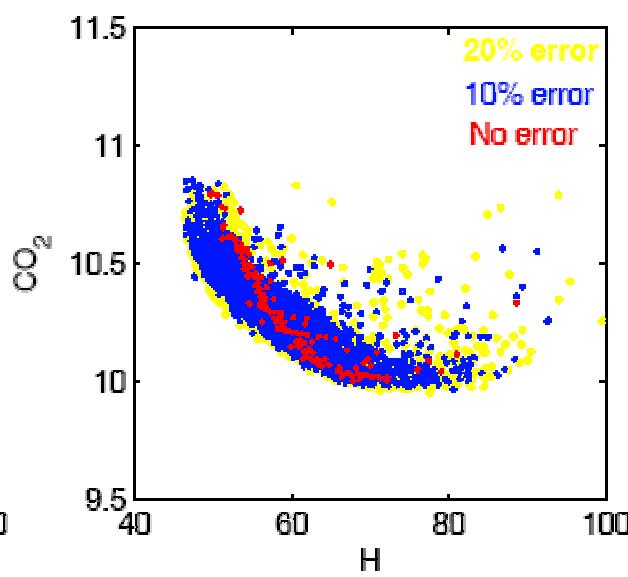
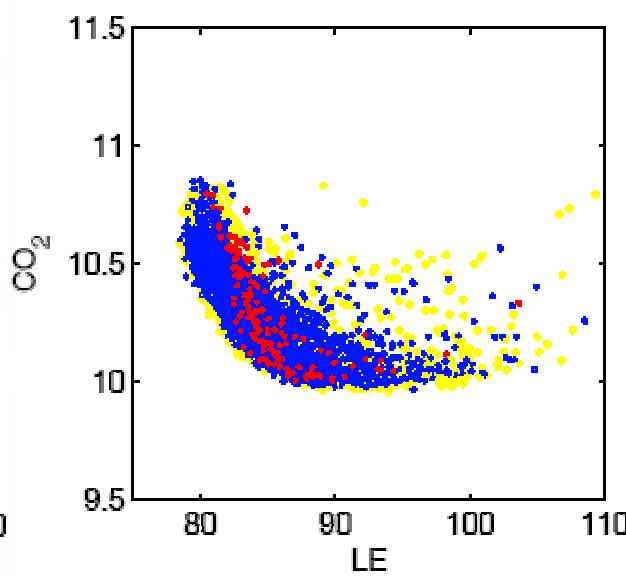
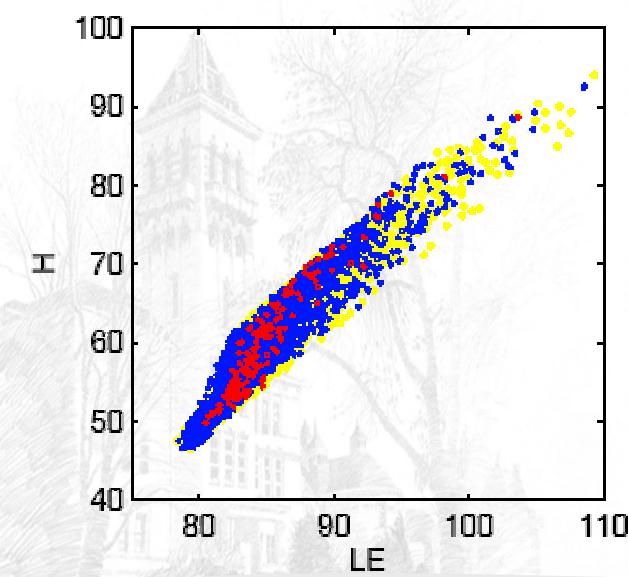
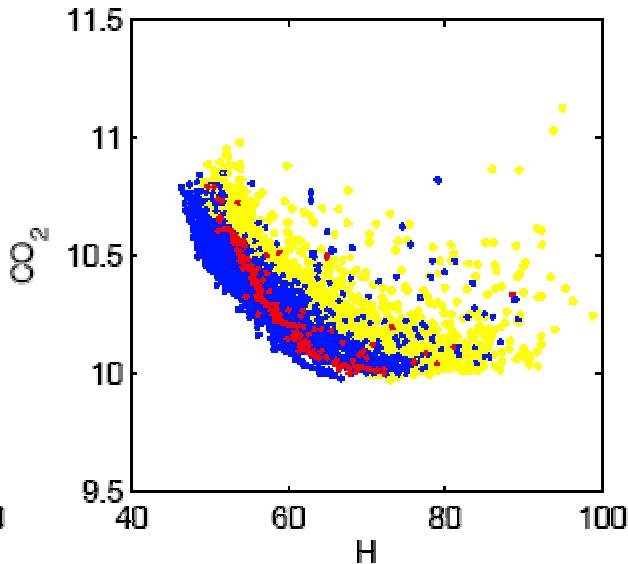
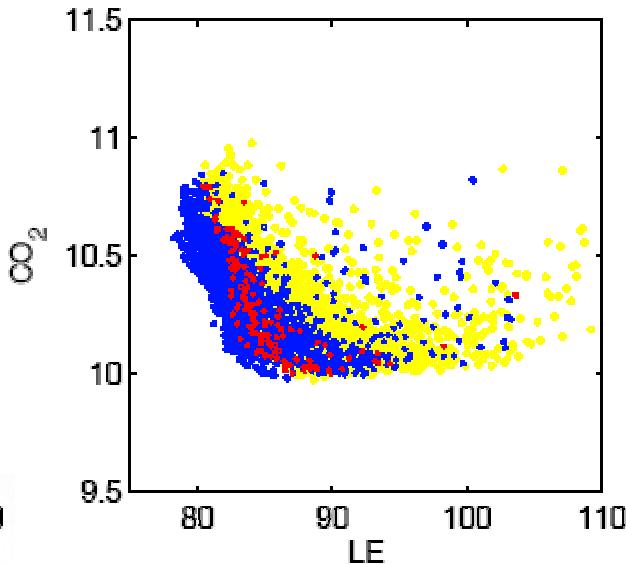
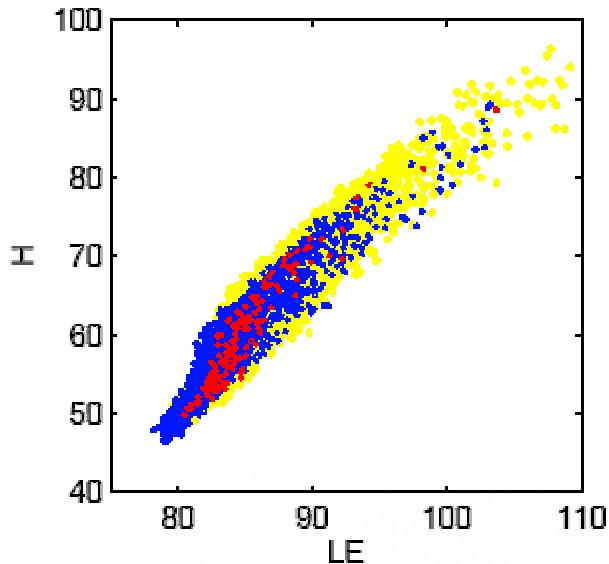
Performance Measures



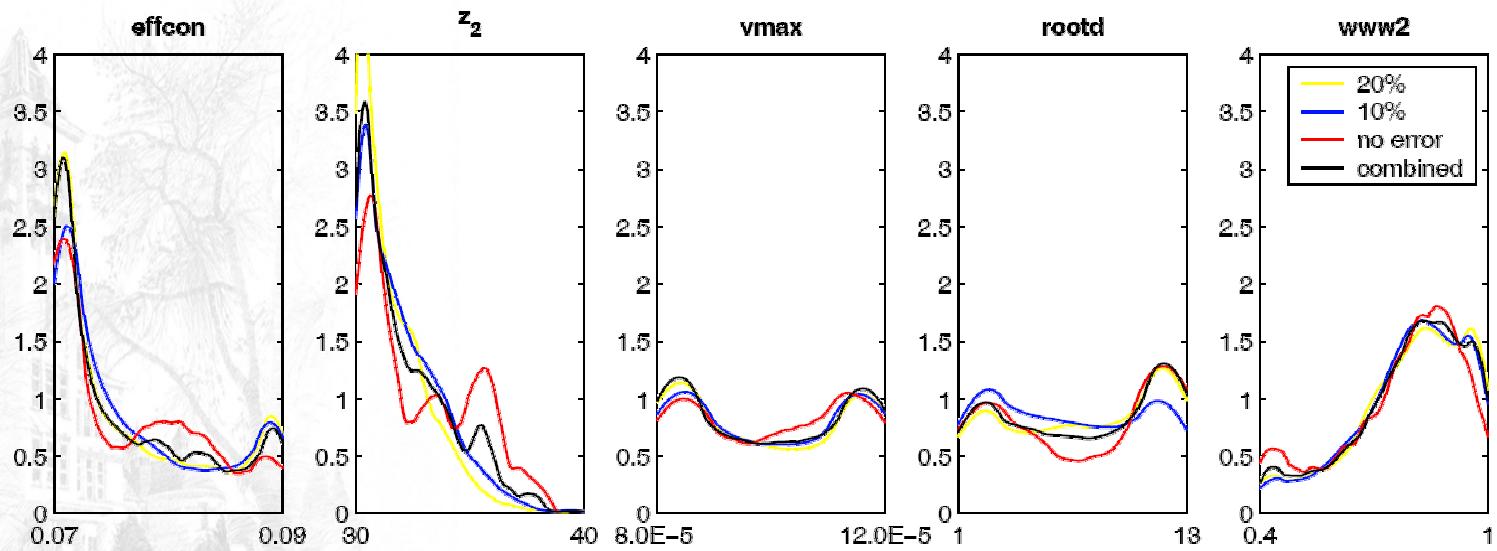
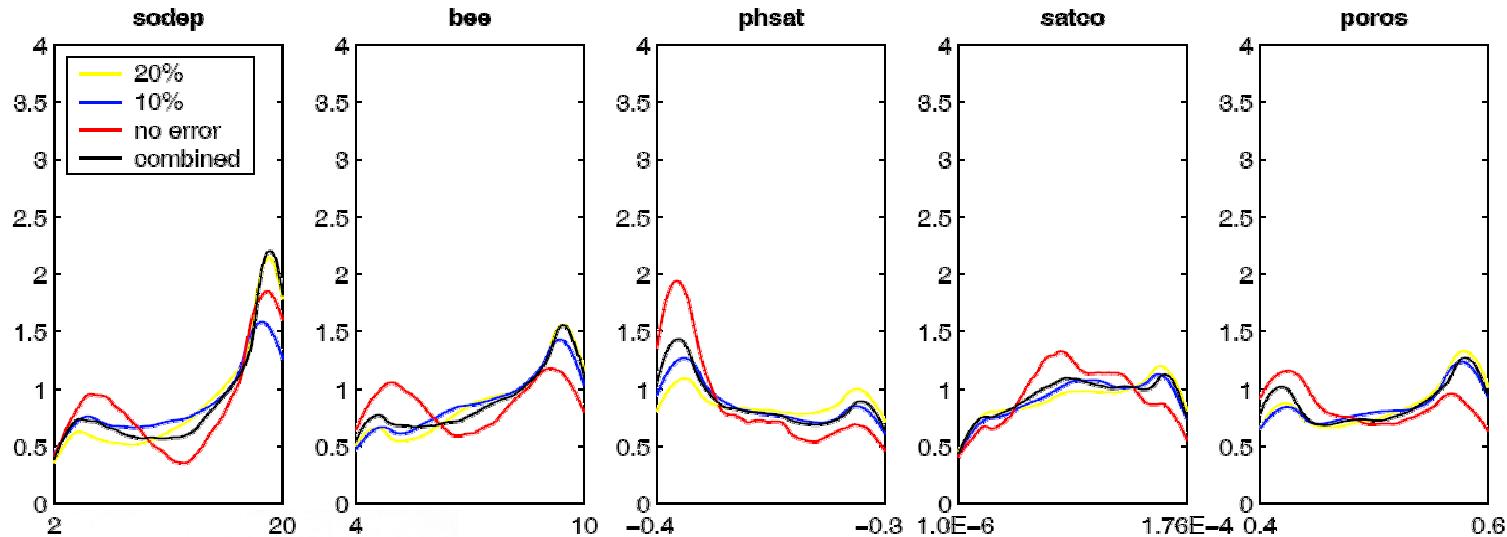


Objectives for Radiation and Precipitation Errors

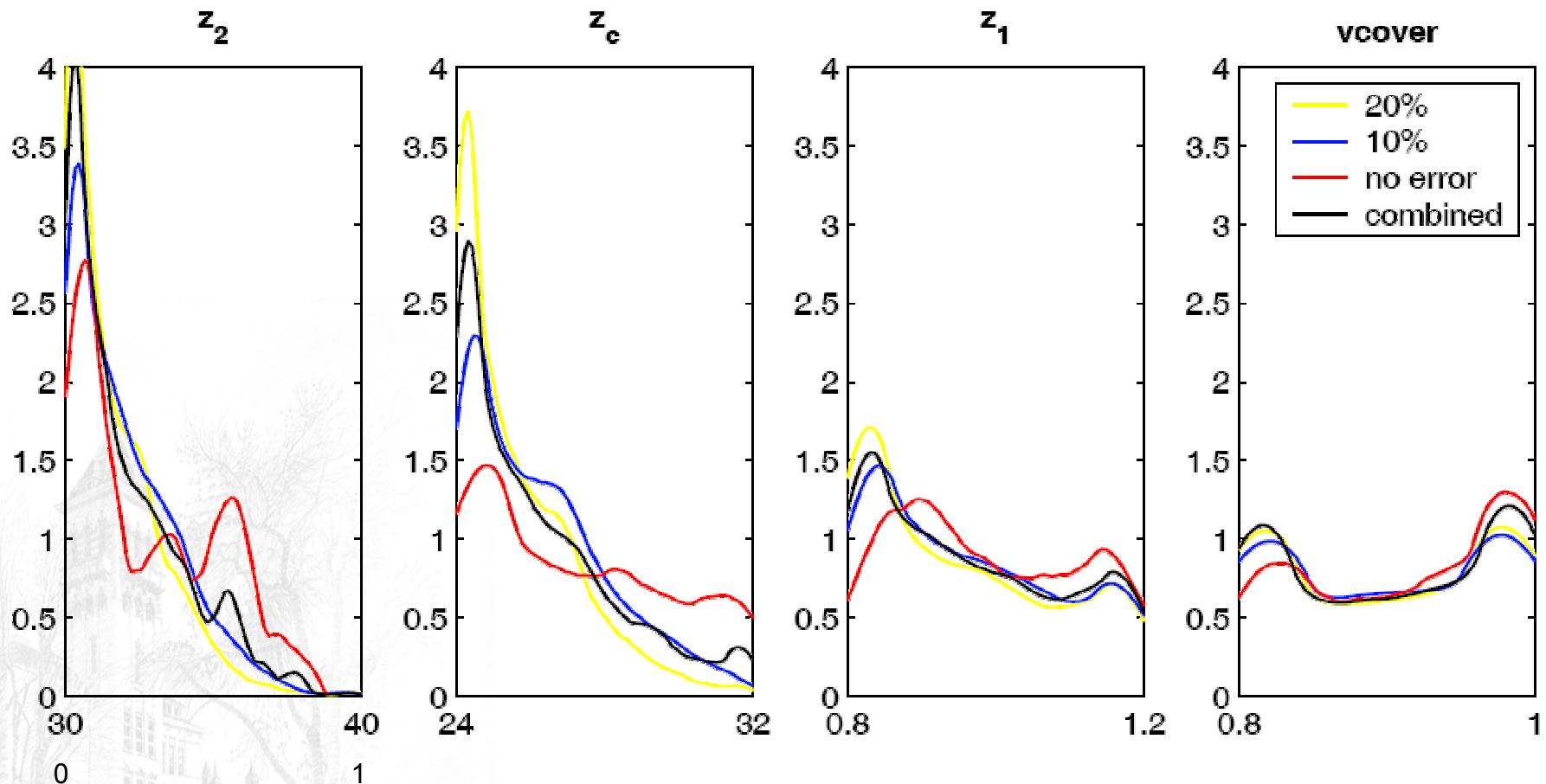
Heteroscedastic Error Added

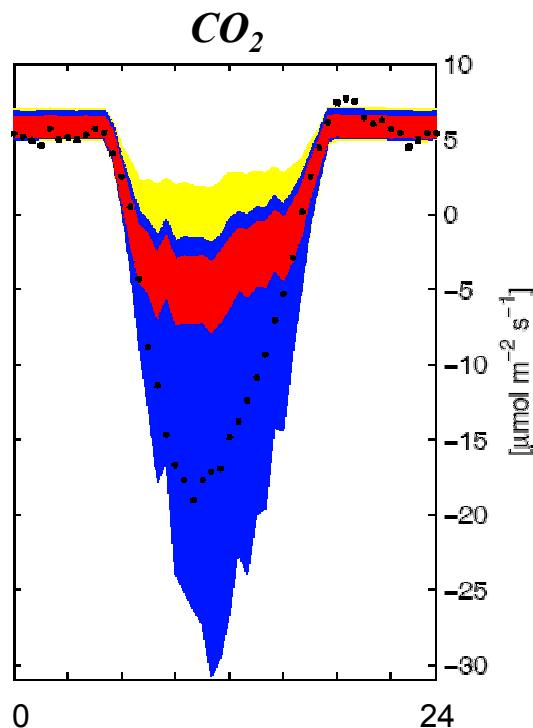
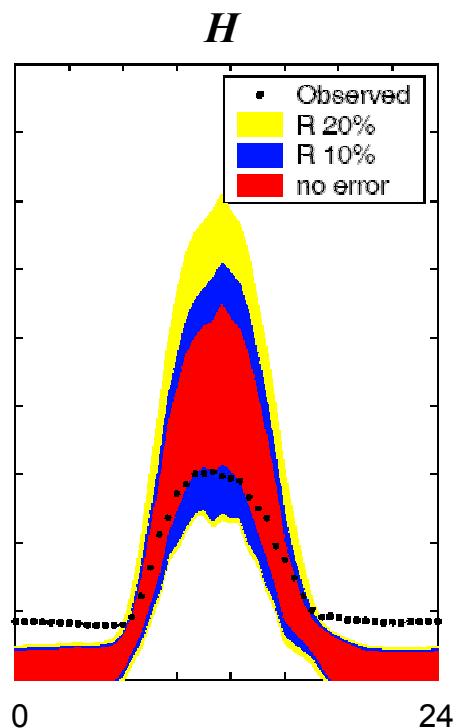
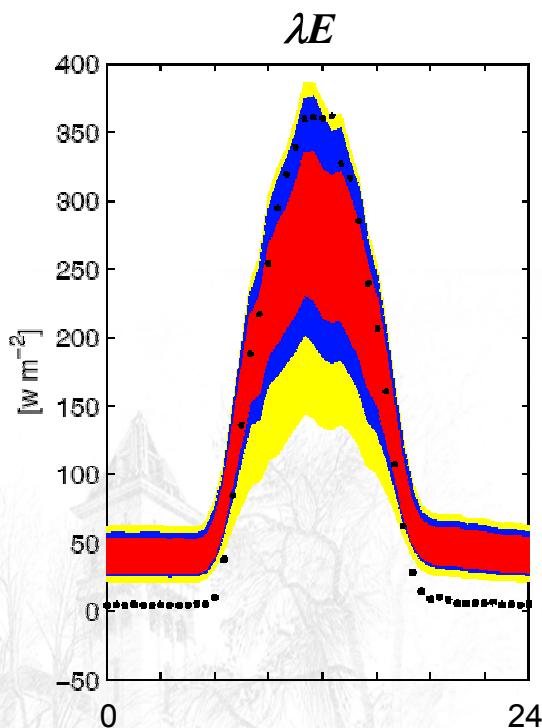


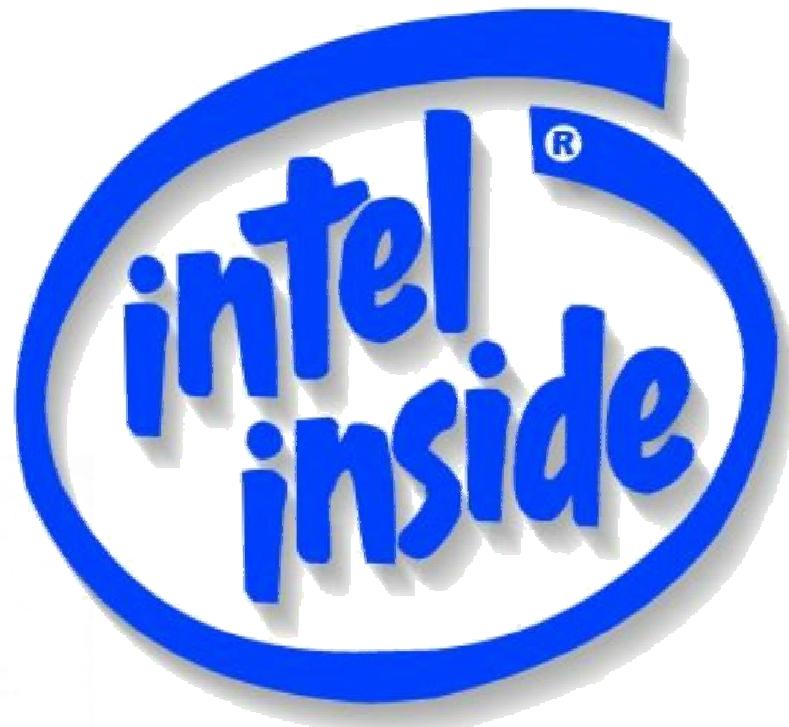
Parameter Distributions



Parameter Distributions







FOOL OUTSIDE

“A fool with a tool is still a fool”