**Biogeosciences
Discussions**

Interactive comment on "On the uncertainty of phenological responses to climate change and its implication for terrestrial biosphere models" *by* M. Migliavacca et al.

Anonymous Referee #2

Received and published: 17 February 2012

General comments Migliavacca et al. effectively demonstrate the need to evaluate and compare different forecast models in phenology and communicate the challenges associated with the evaluation and use of such models in context of possible future scenarios. In general the manuscript is of excellent quality and of high scientific importance. The readability has improved compared to the initial manuscript. However I would appreciate if authors could insert a flow-chart showing methods, data sets and uncertainties arising at different step of your analysis. I recommend publish after minor revisions.

Specific comments What is about the uncertainty of different model-data fusion ap-

proaches: e.g. a different iteration method than the simulated annealing approach. Page 886 line 15 authors should shortly explain the threshold approach and the Sarvas function. Page 887 line 12 "A specific parameter set. . ." please reformulate this sentence in more detail it is difficult to understand. Page 888 line 12 and 13 authors wrote" around 2.0" and in line 23 "around 6.0" whereas in the table 3 you put <2.0 and <6.0. Please explain those numbers and the use of those numbers in more detail. Page 888 line 17 "This evaluation . . . " this paragraph should be more highlighted. Explain the reason for this analysis. Page 889 line 9 : add where in your ms the reader could look at those uncertainties same for paragraph in line 14 and 20. Page 889 line 22 explain shortly the Sen's slope estimation Page 890 line 6 add some critical words concerning the limitation of the used models Page 890 line 24 could you add something like a uncertainty range for the full posterior distribution? Page 891 line 10 onwards: add where in your ms the reader could look to find those estimations. Fig 1: include model names Fig. 2a: could you add uncertainty intervals both lines. Maybe show also the correlation of both lines Fig 2b: indicate on periods where the time series are significant different from each other. How those time series correlate with each other and is the correlation in relation to the correlation in Fig. 2a? Explain more why the bud burs date overlap sometime e.g. in the 2070s. Where the warmer scenario show an delayed onset!? Fig 2c: add uncertainty intervals for each line. Also use not symbols as grey crosses. I would prefer a different line type. Furthermore you cut off the data in around 2050. Fig. 3 legend is not understandable. I do not know what represent a and what are the bars for? Fig. 4: why you used violin plots and not simple box-plots. If you wanted to highlight on the different distributions and the significant differences you should refer to them also in the text. Fig 2c why you haven't plotted the PAR2_CF2 model because it has a considerable low delta AICC value Table 3 add a ranking number

technical corrections: Table 2 correct . . ..chilling units "beings". . .