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My comments concern the use of DIC for spatial models and model comparison. DIC is Bayesian extension of Akaike's (1973) AIC using posterior mean instead of maximum likelihood estimate and DIC also has a more elaborate way of estimating the model complexity than the AIC. Although DIC is more sophisticated I think that same dependency assumptions hold for AIC and DIC. AIC was derived assuming independent data samples. Related FPE criteria by Akaike (1970), which is based on squared error instead of predictive likelihood, may be used for for time series with dependent data if errors are such that $E(\epsilon_i \epsilon_j | X_1, \ldots, X_j) = 0$ for $i < j$. This holds, for example, for finite parameter Markov processes. Burman and Nolan (1992) postulate that functionals other than squared error may also be successfully used, provided that they may be well approximated by a quadratic form. I do not know if these results have been generalized for spatial models. DIC is not based on squared error and above condition for errors does not necessarily hold in complex real life spatial modeling problems. Vehtari (2001) demonstrates (although not in spatial modeling problem) that if there are dependencies in the data DIC does not work correctly. Do the authors have some comments on how the dependencies in their data affect the model comparison and selection based on DIC? How do the authors estimate what is significant difference between DIC values in Table 3?

ADDITIONAL REFERENCES IN THE DISCUSSION

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