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To the editor,

I am pleased to submit the article “A Practical Formulation for an Anisotropic and Nonstationary Matérn Class Correlation Operator” for publication in QJRMS.

In this work, I show how a generic Matérn type correlation operator can be formulated for practical use in variational data assimilation systems. Correlation operators must capture anisotropic and nonstationary behavior inherent to geophysical fluids, and here I show how a mapping method can be used to encode these characteristics into the operator in an intuitive way. Moreover, the model is shown to have two parameters which separately control the effective length scale and shape of the correlation model. This is an improvement over previous models based on the implicit solution of a differential equation, where the effective length scale changes as the shape of the correlation structure is modified.

The correlation model developments shown here build on several papers published in QJRMS. Namely, this work builds on the diffusion-based correlation models from Weaver and Courtier, (2001) and Mirouze and Weaver (2010) (see manuscript for citation details). As such, I think this work would be quite relevant to QJRMS readers.

Sincerely,

Timothy Andrew Smith