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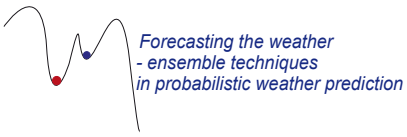

Estimation of flow curvature from 5-beam and 9-beam SODAR's

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We report the first results from combining two 5-beam sodars to obtain measurements of the three vector wind components and their spatial gradients. This system allows for testing whether complex terrain flows exist and, if they do, visualizing the flow pattern. This removes almost completely the need to use a flow model to compensate for remote sensing errors in complex terrain. In doing so, we are also providing a powerful new tool for testing flow models with real in situ data of the type not previously available. We describe our validation of the system on flat terrain and the results of testing various beam-orientation configurations in very complex terrain at a wind farm site in New Zealand where a comprehensively instrumented 80m mast is available. The implementation of the concept in a new single-SODAR design is discussed. Finally, we describe some interesting turbulence and flux measurements from a "common volume" setup where the two SODARs each had an off-vertical beam sampling a single volume above the SODAR.