



Glyph-based analysis of multimodal directional distributions in vector field ensembles

Mihaela Jarema, Ismail Demir, Johannes Kehrler, and Rüdiger Westermann

Computer Graphics & Visualization Group, Technische Universität München, Germany

Ensemble simulations are increasingly often performed in the geosciences in order to study the uncertainty and variability of model predictions. Describing ensemble data by mean and standard deviation can be misleading in case of multimodal distributions. We present first results of a glyph-based visualization of multimodal directional distributions in 2D and 3D vector ensemble data. Directional information on the circle/sphere is modeled using mixtures of probability density functions (pdfs), which enables us to characterize the distributions with relatively few parameters. The resulting mixture models are represented by 2D and 3D lobular glyphs showing direction, spread and strength of each principal mode of the distributions. A 3D extension of our approach is realized by means of an efficient GPU rendering technique. We demonstrate our method in the context of ensemble weather simulations.