ABSTRACT

Visualizing Atmospheric Vortical Flow Using Line Integral Convolution Techniques.

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Line integral convolution (LIC) techniques have provided an insightful method for visualizing vector data. However, although the LIC products indicate the centres, size, and general orientation of the circulation entities, they do not specifically indicate or differentiate inflow from outflow cells. In visualizing atmospheric flows, differentiating inflow from outflow is paramount. Further, inflowing and outflowing circulations within the atmosphere assume very peculiar rotations depending on whether they are located in the Northern or Southern Hemisphere. (For example, in the Northern Hemisphere, inflow circulations are anti-clockwise in nature, while outflow circulations are clockwise. In the Southern Hemisphere, the opposite holds.) This thesis presents a modification to the original line integral convolution method, by addressing these peculiarities to clearly identify the complete nature of the atmospheric flow, irrespective of the hemisphere where its components are located.

Keywords: John Charlery; line integral convolution; visualization; atmospheric flow;