Clustering of cyclones and linkage to large scale flow patterns

By NILS GUNNAR KVAMSTØ[1], YONGJIA SONG[2], IVAR AMBJØRN SEIERSTAD[1], ASGEIR SORTEBERG[2] and DAVID. B. STEPHENSON[1,3]

[1]*Geophysical Institute, University of Bergen, Allegaten 70, N-5007, Norway;* [2]*Bjerknes Centre for Climate Reasearch, University of Bergen, Allegaten 70, N-5007, Norway;* [3]*School of Engineering, Computer Science and Mathematics, University of Exeter,Harrison Building Room 334, North Park Road, Exeter EX4 4QF, UK*

ABSTRACT

Cyclone variability and seriality are intimately linked to the low frequency variability, here represented by the low-frequency flow patterns or teleconnection patterns. This linkage has been investigated in observationally based data and in data generated with the ARPEGE GCM. Comparison of storm track parameters in the two data sets shows that ARPEGE reproduces the main features of the observed cyclone track fields. The model, however, underestimates the mean number of cyclone occurrence and its variance. In the eastern North Atlantic and Nordic Seas the model simulates 70 and 90% of the observed mean cyclone occurrence and its variance, respectively. ARPEGE also substantially underestimates the clustering of cyclones in the eastern North Atlantic (jet exit region). This bias is associated with the model's representation of low-frequency flow patterns in the North Atlantic region.