Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

A new anemometer for 2D atmospheric flow measurements in rough environments HENDRIK HEISSELMANN, MICHAEL HOELLING, JOACHIM PEINKE, ForWind - University of Oldenburg — One major downside of cup anemometry is the different response time for increasing and decreasing wind speeds, causing a systematic over-estimation of the mean wind speed under turbulent conditions. Especially under harsh environmental conditions like in offshore operation, the measuring principle leads to a wear of bearings causing a de-calibration over time and the requirement of regular maintenance. Therefore, we propose the newly developed sphere anemometer as a simple and robust alternative without any moving parts. The sphere anemometer consists of a flexible tube with a sphere mounted on top of it. The drag force acting on the sphere and its support causes a deflection, which is measured by means of a light pointer. Via calibration, this allows for simultaneous determination of wind speed and direction using only one sensor. In our contribution, we introduce the anemometer's setup and it's optimization towards offshore application. Additionally, experimental results obtained from wind tunnel measurements of turbulent flows are presented. Measurements under real wind conditions are compared to those of state-of-the-art wind speed sensors, such as cup and ultrasonic anemometers.

Hendrik Heisselmann
ForWind - University of Oldenburg

Date submitted: 13 Jul 2010 Electronic form version 1.4