

A Linear Array of Wind and Pressure Sensors for High Resolution in situ Measurements in Winter Tornadoes

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The Shonai area railroad weather project has investigated fine-scale structure of wind gust dynamics and kinetics such as tornadoes, downbursts, and gust fronts. As part of the project, in order to improve our understanding of near-surface tornadic features, we developed a linear array of wind and pressure sensors (**LAWPS: Linear Array of Wind and Pressure Sensors**) for high resolution in situ measurements in winter tornado cores. The wind and pressure sensors were deployed along a 1.2-km-long linear array that is located parallel to and about 100m from the shoreline. Wind data are obtained using 12 two-dimensional fast-response ultrasonic anemometers placed at a height of 5 m at intervals of 100 m. Pressure data are obtained using 25 barometers placed at a height of 50cm at intervals of 50 m. The pressure ports are designed and loaded to the barometers to reduce the dynamic pressure associated with wind and turbulence. Sampling intervals for both wind and pressure measurements are 100 msec and the sampling are synchronized by the external trigger from data logging computer. In this presentation, the system overview and the measurement technique will be described.

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