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High-frequency wind and temperature structure during onsets of foehn

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During 16 months, temperature, wind, and humidity profiles were collected on a 100-meter tower. The mast was located in the Alpine foothills, in a gap where strong foehn winds are experienced regularly. Basic data was collected at 10-minute intervals using classical instrumentation. Additionally, temperature and wind at 41 and 96 meters above ground were recorded at 1-second intervals by two ultrasonic anemometers. First analyses show the extremely turbulent structure of foehn onsets. Of particular interest are the regular variations of wind speed with periodicities in the second range. These can pose a serious threat to structures such as wind turbines, cable structures, trains etc. The same is true for the significant vertical shears. First analyses give an idea of the amplitudes, frequencies, and prevalence. Additionally, the comparison of the 1-second with the 10-minute data allows deriving procedures for estimating reliable gust intensities from 10-minute data for specific conditions. The ultimate goal of the investigation is to suggest more reliable warning procedures for foehn-induced windstorms, which are still a serious threat to boats, cable cars, trains, and traffic in general.