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Characterization of near-surface turbulence in the stable atmosphere of the Alpine Inn Valley

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The stable boundary layer is typically characterized by weak and sometimes intermittent turbulence, particularly under very stable conditions. In mountain valleys, nocturnal temperature inversions and cold-air pools form frequently under synoptically undisturbed and clear-sky conditions, which will dampen turbulence. On the other hand, thermally driven slope and valley winds form under the same conditions, which interact with each other and are both characterized by jet-like wind profiles, thus resulting in both horizontal and vertical wind shear, which creates a persistent source for turbulence production. Data will be presented from six flux towers in the Austrian Inn Valley, which are part of the i-Box measurement platform, designed to study near-surface turbulence in complex, mountainous terrain. The six sites are located within an approximately 6.5-km long section of the 2-3-km wide valley approximately 20 km east of Innsbruck. The data are analyzed to characterize the strength and intermittency of turbulence kinetic energy and turbulent fluxes across the valley and to determine whether the persistent wind shear associated with thermally driven flows is sufficient to generate continuous turbulence.