

The turbulence characteristics of atmospheric boundary layer on the north slope of Mt. Qomolangma (Mt. Everest) region in spring 2005

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Abstract. Eddy-correlation (heights of 3 m) measurements performed on the base camp of Mt. Everest are used to study the characteristics under conditions of katabatic and large-scale forcing in spring 2005. The base camp of Mt. Everest is 4 km far from the end of Rongpu glacier on the Mt. Everest (China). We consider cases where large-scale forcing results in a downslope ambient wind. Firstly the normalized standard deviations of wind speed and temperature compare favorably to findings in the literature. Second we describe the (co)spectral characteristics of turbulence respectively blowing southerly wind and northerly wind under near neutral stratification. The analysis of averaged spectra and co spectra reveals that low and mid frequency perturbations have a large influence on the variances of vertical wind components and temperature and also alter the co spectra of momentum and sensible heat flux under blowing southerly wind. The spectrum of the horizontal wind speed is comparable to universal spectra. The middle frequency perturbations occur as brief intermittent events and result in downward entrainment of ambient air thereby producing enhanced downward sensible heat fluxes and downward as well as upward momentum fluxes with various magnitudes and timescales. The perturbation of low and mid frequencies is introduced spectral power of $S_w(f)$ is reduced results from glacier wind on the outer layer. The $C(uw)$ cospectra and $C(Tw)$ cospectra is minus in the mid and high frequency due to downward moment flux and heat flux respectively. On the other hand, mid frequency perturbations have also a large influence on the variances of vertical wind components under blowing northerly wind.

Keywords: glacier wind, Glacio-meteorology, Spectra, normalized 3 dimension wind, temperature and humidity