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For the bulk exchange coefficient Ch

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The bulk method is often used to calculate momentum flux, sensible heat flux, latent heat flux in the atmospheric boundary layer, and assumes that heat exchange of air occurs due to turbulent diffusion. However, in this research, it is proved that vertical profile of air temperature is almost uniform by convection from the surface 0.5 cm above and there is a heat boundary layer near the land surface where turbulent diffusion does not occur. Therefore we concluded that we cannot use the bulk formulation which assumes turbulent diffusion to calculate the vertical profile of air temperature and heat balance near the surface. But then suggesting the sensible heat is transported because of thermal conduction through the heat boundary layer of 0.5 cm near the surface, we calculated the bulk exchange coefficient Ch , which means the vertical exchange rate of air masses of different temperatures in the bulk formulation, and confirmed that this Ch is nearly equal to the Ch which is estimated assuming turbulent diffusion. Consequently, it is suggested that we should recognize Ch means the heat transport rate because of not turbulence diffusion but thermal conduction.

Keywords: bulk formulation, boundary layer, sensible heat