

EVIDENCE OF COUNTER-DIFFERENCE SURFACE HEAT FLUXES AND ITS HYPOTHESES

Title	EVIDENCE OF COUNTER-DIFFERENCE SURFACE HEAT FLUXES AND ITS HYPOTHESES
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Abstract	<p>Parameterization of surface heat flux estimates near-surface turbulent heat fluxes from differences of potential temperature between the surface skin and the mid-mixed layer (ML). The rate of this turbulent transport is proportional to the product of a convective velocity times an empirical transport coefficient. New data from three different sites within Boundary Layer Experiment - 1996 (BLX96) are used to evaluate surface heat flux parameterization. Old data from six other field programs (BLX83, Koorin, FIFE, Monsoon 90, HAPEX-MOBILHY, and TOGA-COARE) are re-analyzed to test this parameterization. Evidence from virtually all of these experiments indicates that the empirical transport coefficient for heat fluxes ($C^* H$) does not depend on surface roughness. Positive turbulent heat fluxes are observed to exist near the bottom of the ML even when there is zero potential temperature difference ($\Delta T_{ML} = 0$) between the surface skin and the mid-ML. Evidence suggests that positive heat fluxes could also occur when the surface skin has a slightly colder potential temperature than the mid-ML, implying a flux that is opposite or counter to the potential-temperature difference. Such counter-difference fluxes could be explained by an infrared radiative transfer from the surface skin, or by non-equilibrium conditions during rapidly-changing insolation near sunset. Fluks panas turbulen dekat permukaan dapat diestimasi dari selisih antara suhu potensial di batas permukaan (surface skin) dan di bagian tengah lapisan tercampur (mid-mixed layer). Kecepatan dari transpor turbulen ini sebanding dengan perkalian antara koefisien empiris transpor dengan kecepatan konvektif. Data baru dari hasil pengukuran BLX96 pada 3 lokasi yang berbeda akan digunakan untuk mengevaluasi parameterisasi ini. Sementara data yang diperoleh dari yang pernah dilakukan sebelumnya (BLX83, Koorin, FIFE, Monsoon 90, HAPEX-MOBILHY, and TOGA-COARE) digunakan untuk menguji hasil parameterisasi ini. Hasil yang diperoleh mengindikasikan bahwa koefisien empiris transpor untuk fluks panas tidak tergantung pada kekasaran permukaan (surface roughness). Bukti juga menunjukkan bahwa fluks panas positif dapat terjadi ketika suhu potensial di surface skin sama atau sedikit lebih dingin daripada di mid-mixed layer. Kejadian seperti ini, disebut counter-difference fluxes, dapat dijelaskan dengan transfer radiasi infra merah dari surface skin atau dengan kondisi ketidaksetimbangan perubahan secara cepat insolasi saat mendekati matahari terbenam.</p>
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