

Abstract Submitted  
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**Comparison of turbulence in a transitional boundary layer to turbulence in a developed boundary layer\*** G.I. PARK, Stanford Univ., J. WALLACE, Univ. of Maryland, X. WU, Royal Military College of Canada, P. MOIN, Stanford Univ. — Using a recent DNS of a flat-plate boundary layer, statistics of turbulence in transition at  $Re_\theta = 500$  where spots merge (distributions of the mean velocity, rms velocity and vorticity fluctuations, Reynolds shear stress, kinetic energy production and dissipation rates and enstrophy) have been compared to these statistics for the developed boundary layer turbulence at  $Re_\theta = 1850$ . When the distributions in the transitional region, determined in narrow planes  $0.03Re_\theta$  wide, exclude regions and times when the flow is not turbulent, they closely resemble those in the developed turbulent state at the higher Reynolds number, especially in the buffer and sublayers. The skin friction coefficient, determined in this conditional manner in the transitional flow is, of course, much larger than that obtained by including both turbulent and non-turbulent information there, and is consistent with a value obtained by extrapolating from the developed turbulent region. We are attempting to perform this data analysis even further upstream in the transitioning flow at  $Re_\theta = 300$  where the turbulent spots are individuated. These results add further evidence to support the view that the structure of a developed turbulent boundary layer is little different from its structure in its embryonic form in turbulent spots. \*CTR 2010 Summer Program research.

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