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Turbulent boundary layer, wall shear-stress statistics using a predictive wall-model combined with LES[1] DALE PULLIN, MICHIO INOUE, California Institute of Technology, ROMAIN MATHIS, IVAN MARUSIC, University of Melbourne — Time-wise velocity signals obtained from large-eddy simulation (LES) within the near-wall, logarithmic region of the zero-pressure gradient, flat-plate turbulent boundary layer are used as input to a calibrated, empirical wall model (Mathis *et al*, 2011) to calculate the statistics of the fluctuating, wall shear stress τ_w. These are compared with DNS (Schaltter & Örlü, 2011; Komminaho & Skote, 2002) at lower Reynolds number and with statistics obtained using the empirical wall model applied to experimentally generated time-series. The DNS, experimentally-based and LES-based predictions are consistent with a log-like increase of $\overline{(\tau_w'^+)^2}$ with Re_τ. It is argued that the LES is thus able to capture large-scale motions within the log-region that are generating this increased wall activity, up to $Re_\tau = 2 \times 10^5$.

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