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Modeling near-wall turbulent flows IVAN MARUSIC, ROMAIN MATHIS, NICHOLAS HUTCHINS, University of Melbourne — The near-wall region of turbulent boundary layers is a crucial region for turbulence production, but it is also a region that becomes increasing difficult to access and make measurements in as the Reynolds number becomes very high. Consequently, it is desirable to model the turbulence in this region. Recent studies have shown that the classical description, with inner (wall) scaling alone, is insufficient to explain the behaviour of the streamwise turbulence intensities with increasing Reynolds number. Here we will review our recent near-wall model (Marusic *et al.*, *Science* 329, 2010), where the near-wall turbulence is predicted given information from only the large-scale signature at a single measurement point in the logarithmic layer, considerably far from the wall. The model is consistent with the Townsend attached eddy hypothesis in that the large-scale structures associated with the log-region are felt all the way down to the wall, but also includes a non-linear amplitude modulation effect of the large structures on the near-wall turbulence. Detailed predicted spectra across the entire near- wall region will be presented, together with other higher order statistics over a large range of Reynolds numbers varying from laboratory to atmospheric flows.

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