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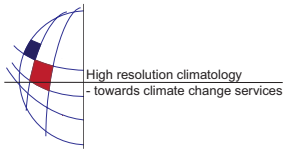

Global climatology of diurnally varying low-level jets

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This talk documents the global distribution and characteristics of nocturnal low-level jets (NLLJs), particularly their diurnal and vertical structure. NLLJs are ubiquitous features within the world's land covered areas, and regularly occur during the warm season, with a smaller frequency of occurrence during the cool season. To accomplish this goal, a new 21-year global reanalysis was performed with an MM5-based global climate downscaling system using a grid spacing of 40 km. A unique characteristic of the reanalysis is the availability of hourly three-dimensional output, which permits the full diurnal cycle to be analyzed. Furthermore, the horizontal grid spacing of 40 km better resolves many physiographic features that host LLJs, compared to other widely used global reanalyses. The first available objectively constructed global maps of recurring NLLJs are created from this index, where the various NLLJs can be simultaneously viewed at or near their peak time. These maps not only highlight all the locations where NLLJs are known to recur, but also reveal a number of new jets.

The presenter will describe the basic mechanisms that give rise to two newly identified NLLJs, each having a profound influence on the regional climate. The first is the Tarim Pendi NLLJ in northwest China, and the second is the Namibia-Angola jet in southwest Africa. Jets in these two regions are used to illustrate the variety of physiographic and thermal forcing mechanisms that can produce NLLJs, and how the NLLJs in some regions have a strong statistically significant impact on extremes of rainfall. The shallowness of the jets, their dependence on turbulence, their ubiquity and intensity underscore a fundamental challenge to global weather and climate modeling of the distribution of atmospheric constituents originating from the Earth's surface and human activity.