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Effects of Flamelet Generated Manifolds on Turbulent Flame Structure and Pollutant Emissions A. CODY NUNNO, TEMISTOCLE GRENGA, MICHAEL E. MUELLER, Princeton University — Heat losses substantially modify turbulent combustion processes, especially the formation of pollutant emissions such as nitrogen oxides, which are highly sensitive to temperature. To account for heat loss effects in Large Eddy Simulation (LES) with flamelet models, *a priori* flamelet solutions are computed at reduced enthalpy. In this work, two methods for generating flamelets of lower enthalpy are compared to determine under what conditions the different methods produce different flame structure and different pollutant emissions in order to determine their validity limits. In the first method, a variable heat loss is introduced into the flamelet solutions that mimics a real heat loss, reducing the enthalpy primarily in the post-flame region of the flamelet. In the second method, fuel and oxidizer are converted to products in the unburned gases while retaining a constant unburned temperature, reducing the enthalpy over the entire flamelet. The two methods are compared in methane-air piloted turbulent premixed planar jet flames with increasing levels of dilution with both water and carbon dioxide that maintain a constant adiabatic flame temperature. The "product conversion" method is expected to mirror some of the same effects as physical dilution.

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