The temperature measured by non-linear excitation regime two-line atomic fluorescence, NTLAF, is compared with previous data in a well characterised turbulent non-premixed flame, known as the TNF DLR-A flame. The NTLAF measurements were obtained using two different seeding methods, both separately and together, namely by seeding the indium as a solution of indium chloride conveyed as a fine mist with the fuel and by directly seeding neutral indium atoms into the fuel stream by laser ablation of an indium rod. Both instantaneous images and radial profiles of the mean and RMS data are reported for the different techniques. The calculated inter-pixel uncertainty of the measurements is estimated to be ~ 50 K in the mean, and 8% uncertainty on an instantaneous basis. The comparison is performed on a conditional basis, given that the NTLAF measurements are limited to a lower temperature threshold and to the stoichiometric and rich regions of the flame. On this basis, the NTLAF method is found to generally agree with the TNF DLR-A data to within approximately 100 K.

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