



Investigation of the Dominant Factors Influencing the ERA15 Temperature Increments at the Subtropical and Temperate Belts with a Focus over the Eastern Mediterranean Region

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A Stepwise Multi Regression-based statistics was employed for prioritizing the influence of several factors, both anthropogenic and natural, on the ERA15 temperature increments. The 5 factors which are defined as predictors are; topography, aerosol index (TOMS-AI), atmospheric vertical velocity along with two anthropogenic factors population density and land use changes (LUCI and NDVI trends). The seismic hazard assessment factor was also chosen as the "dummy variable", for validity. Special focus was given to the land use change factor, which was based on two different data sets; HITE data of historical land use/ land cover data and of NDVI trends during 1982-1991. The Increment Analysis Updates of temperature (IAU(T)), the predicted data, was obtained from the ERA15 (1979-1993) reanalysis. The research consists of both spatial and vertical analyses as well as potential synergies of the selected variables. The spatial geographic analysis is divided into three categories; (a) Coarse region (b) Sub regions analysis and (c) A "small cell" of 4°X4° analysis. It is shown that the following three factors; Topography, TOMS-AI and NDVI are statistically significant (at $p < 0.05$ level) in being the most effective predictors of IAU(T), especially at the 700mb level during March - June. In contrast, the 850mb presents the weakest contribution to IAU(T) probably due to contradictive influence of the various variables at this level. The land use as expressed by the NDVI trends factor, shows a very clear dependency with height, i.e. decreasing, and is one of the most influential factors over the Eastern Mediterranean, which explains up to 20% of the temperature increments in January at 700mb. Moreover, its influence is significant ($p < 0.05$) through all research stages and the different combinations of the multiple regression runs. A major finding not quantified earlier.

Reference: T. Hirsch-Eshkol, A. Baharad and P. Alpert, "Investigation of the dominant factors influencing the ERA15 temperature increments at the subtropical and temperate belts with a focus over the Eastern Mediterranean region", *Land*, 3, 1015-1036; doi:10.3390/land3031015, 2014.