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Juan M Restrepo* (restrepo@math.arizona.edu), Mathematics Building, 617 N Sta Rita, University of Arizona, Tucson, AZ 85721, and **Darin Comeau** and **Hermann Flaschka**. *How Do You Determine Whether The Earth Is Warming Up?* Preliminary report.

How does one determine whether the high summer temperatures in Moscow of a few years ago was an extreme climatic fluctuation or the result of a systematic global warming trend? How does one perform an analysis of the causes of this summer's high temperatures in the US, if climate variability is poorly constrained? It is only under exceptional circumstances that one can determine whether a climate signal belongs to a particular statistical distribution. In fact, climate signals are rarely "statistical;" there is usually no way to obtain enough field data to produce a trend or tendency, based upon data alone. There are other challenges to obtaining a trend: inherent multi-scale manifestations, and nonlinearities and our incomplete knowledge of climate variability. We propose a trend or tendency methodology that does not make use of a parametric or a statistical assumption and it is capable of dealing with multi-scale time series. The most important feature of this trend strategy is that it is defined in very precise mathematical terms. (Received September 12, 2012)