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The role of transient eddies and diabatic heating in the maintenance of heat waves: a nonlinear quasi-stationary wave perspective

Christian Franzke¹ and Qiyun Ma²

¹Pusan National University, Center for Climate Physics, Institute for Basic Science, Busan, Korea, Republic of (christian.franzke@gmail.com)

²Alfred-Wegener Institut, Germany

Heat waves result from large-scale stationary waves and have major impacts on the economy and mortality. However, the dynamical processes leading to and maintaining heat waves are still not well understood. Here we use a nonlinear stationary wave model (NSWM) to examine the role played by anomalous stationary waves and how they are forced during heat waves. We will discuss heat waves in Europe and Asia. We show that the NSWM can successfully reproduce the main features of the observed anomalous stationary waves in the upper troposphere. Our results indicate that the dynamics of heat waves are nonlinear, and transient momentum fluxes are the primary drivers of the observed anomalous stationary waves. We will also discuss the role of anomalous SSTs in influencing heat waves.