

Abstract: This thesis tests the ability of the Lorenz's (2005) chaotic model to simulate predictability curve of the ECMWF model calculated from data over the 1986 to 2011 period and demonstrates similarity of the predictability curves for the Lorenz's model with $N = 90$ variables. This thesis also tests approximations of predictability curves and their differentials, aiming to correct the ECMWF model estimated parameters and thus allow for estimation of the largest Lyapunov exponent, model error and limit value of the predictability curve. The correction is based on comparing the parameters estimated for the Lorenz's and ECMWF and on comparison with the largest Lyapunov exponent ($\lambda=0,35 \text{ day}^{-1}$) and limit value of the predictability curve ($E_{\infty}=8,2$) of the Lorenz's model. Parameters are calculated from approximations made by the Quadratic hypothesis with and without model error, as well as by Logarithmic and General hypotheses and by hyperbolic tangent employing corrections with and without model error. Average value of the largest Lyapunov exponent is estimated to be $\lambda=0,37 \text{ day}^{-1}$ for the ECMWF model, limit values of the predictability curves are estimated with lower theoretically derived values and new approach of calculation of model error based on comparison of models is presented.