This rigorous thesis is engaging by some processes in boundary layer of the atmosphere, namely rise and running of thermals, focused on vertical motion and speeds of thermals, and on methods of their measurement and forecasting. It exploits data, measured by the GPS receivers and loggers aboard of gliders and paragliders during flying over Czech Republic, and data from aerological soundings, provided by Praha-Libus observatory. Measurement was in progress in so called cross-country flight season 2007 and 2008. The solution of this research is improvement of forecasting of vertical velocity of thermals and can be used in specialised forecasts for private and recreative flying and in forecasts of thermal turbulence.