Evaluating the success of the weather forecast is a fundamental factor in improving their quality. It is necessary to use statistical methods for this evaluation. However, the existence of a large number of statistical methods complicates their choice and comparing the results of different studies. To bridge this knowledge problem, we dealt with statistical methods suitable for evaluating accuracy of short-range weather forecasts of deterministic variables. Thesis is dedicated to utilization of statistical methods for verifying radar echo nowcasting and for forecasts of numerical weather prediction models. In addition, it also deals with the use of statistical methods for defining loss functions and their use for learning the radar echo nowcasting model. Learned nowcasting models were verified. Numerical weather prediction models ICON and WRF were included to the work. Forecasts were verified with data from synoptic stations and ERA5 reanalysis in the domain of the Czech Republic. The forecasts of the radar echo of the nowcasting models pySTEPS, rainymotion and MWNet v1.0 were verified with radar images in the domain of the Czech Republic. In most cases, the statistical methods agreed on the results of the evaluation of the weather forecast by the numerical weather prediction models. The differences between the results of the evaluation of the radar echo nowcasting models were more pronounced. Our analysiss showed that the choice of a loss function for learning the nowcasting model is fundamental to improve the model's ability to predict radar echo. Most of the loss functions enhanced the forecast of higher radar reflectivity. Among the best loss functions can be included L1L2, PCC_L1L2_CSI0.65 and SmthL1_0.6. We conclude that statistical methods are important and their choice can greatly affect verification of weather forecast. Their use in loss functions substantially influence learning of nowcasting model.