The purpose of this research is to study the effect of using different parameterizations such as surface layer option (sf_sfclay_physics), land-surface option (sf_surface_physics), longwave radiation option (ra_lw_physics) and shortwave radiation option (ra_sw_physics). Those parameters will be used inside a customized high-resolution Advanced Research WRF (WRF-ARW) to model and produce a forecast for surface temperature (both maximum and minimum). To generate a successful forecast, the (WRF-ARW) model relies heavily on the accuracy of model input that is used as the initial and boundary conditions, in order to assess the skill and quality of the temperature forecasts. Eventually, the necessary conditions and the best physical parameterizations to accurately forecast surface temperature over Sudan will be determined. And the model’s forecast will be correlated against observed values for both maximum and minimum temperature along with a time series and scatter plot and interpretation of verification statistics (Mean Absolute Error (MAE), the root mean square error (RMSE)).

**Key words:** (WRF-ARW) model, Temperature Forecast.