

Climate change is the main topic in the broad scientific community for its natural, social and economical consequences and its impact on human lives. The global carbon cycle is a major component in these problems. High rates of anthropogenic CO<sub>2</sub> emissions have been partly restrained by terrestrial ecosystems. Understanding carbon flows and mechanisms in different land use is essential for mitigation of further changes. This diploma thesis applies soil organic matter model RothC-26.3 to simulate the effect of awaited climate change on two agricultural sites in the Czech Republic - Ruzyně and Lukavec, from 1990 until 2065. Simulations were executed for three sowing plans: traditional Norfolk, canola cultivation and change from agricultural land to a grassland. In Ruzyně, the accumulation of total on-site carbon was observed in all these three sowing plans for the whole time period. In Lukavec, the Norfolk sowing plan showed a slight loss of carbon, the carbon in the canola sowing plan stagnated and in the land-use change case the carbon rose. The main difference between the sites is the clay content percentage, however, clay is not responsible for such a difference between the sites. There was not much comparison between measured and modelled data as yet; this is planned to be done in further research to either confirm or disprove the model's outputs.