

Tick-borne encephalitis risk assessment based on classification of vegetation from remote sensing data

Abstract

The main aim of this thesis has been to find out how to classify various categories of forest vegetation with a different risk of exposure to the tick-borne encephalitis based on the Landsat imagery. The legend used here is derived from the one used in the projects by Daniel, Kolář, Zeman (1995) and Daniel, Kolář, Beneš (1999) but has been reduced to only five classes with no overlaps in their definitions (I. coniferous stands, II. mixed stands, III. young deciduous stands and stand ecotones with a highly heterogeneous structure, IV. deciduous stands with a homogeneous structure, V. deciduous stands with a heterogeneous structure). The supervised classification with the Maximum Likelihood Classifier has been used on the Landsat imagery from various seasons. Difficulties concerned with the presence of clouds and varying Sun elevation across the imagery had to be addressed in the course of the work. The training sites and the control points have been defined by the field research and interpretation of the relevant orthophotomaps and Landsat imagery in 5-4-3 RGB composite. The mask of the forest has been created on the ZABAGED data basis. The time horizon of 2006 – 2010 has been the primary focus. The imagery acquired in April, August and October for these years was available. Both the uncorrected bands and bands corrected by ATCOR 2 and ATCOR 3 have been tested as the inputs to the classification. The principal component analysis has been also tested as well as the vegetation indices (NDVI and Tasseled Cap). For the time horizon 1998 – 2002, for which the imagery acquired in March, May and July by Landsat 7 ETM+ was available, the PANSHARP algorithm has been also tested for purposes of the classifications. The best results in both time periods were achieved by the principal components and ATCOR 3 inputs to the classification. A part of the thesis is dedicated to the assessment of the impacts of the Cubic Convolution resampling (applied on the Landsat data in the USGS's archive) to the classification's results.

Key words: Landsat, classification, vegetation, tick-borne encephalitis