**MOVE - Working Days Report: Tracking Recreational Behavior** University of Zurich, Oct. 27-28, 2011

**Organizers:** Hans Skov-Petersen (Univ. of Copenhagen), Reto Rupf (Zurich Univ. of Applied Sciences)

**Objectives**: Exchange, discussion and development of concepts for the analysis of GPS tracks of recreationist – hikers and mountain bikers:  
Automated pre-processing (data cleaning, detection of stops), analysis of places, and analysis of trajectories

**Data set:** Sample data of the project mafreina (management toolkit recreation and nature –[www.mafreina.ch](http://www.mafreina.ch)), which is aiming to provide predictive environmental planning tools to simulate the impact of management decisions on the recreation-wildlife-system.  
Provided data: uncleaned point raw data of 30 hiking tracks and 20 mountain bike tracks (shape file point data), digital elevation model (raster), land cover (polygons), summer trail network (polylines), and demographical data

**Program:**

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| Preparation | The participants acquainted themselves with the data set, applied their concepts of analysis, and prepared presentation of their findings and experience. |
| Thursday | All presentations were followed by intense discussions:   * Introduction and background information about the project mafreina and the data. (Hans Skov-Petersen, Reto Rupf and Daniel Koechli) * Analytical framework for analyzing tracking data (Hans Skov-Petersen) * The search of way points – where do people take a break? (Daniel Koechli, Erik Saluveer) * Spatio-temporal recreational use– searching for a measure to describe wildlife disturbance intensity (Martin Wyttenbach) |
| Friday | * Using platforms for analysis of move data – data mining: Secondo (Thomas Behr) * M-Atlas (Salvo Rinzivillo) * Algorithms for trajectory analysis (Somayeh Dodge, Maike Buchin) * Group work and discussions: Defining breaks, identification of activity types and requirements of move data exchange |

**Outcomes:**

Data cleaning process is a difficult but a very important step – meta data can help: Questions have to be answered such as: Where are the starting and end points? How do we handle imprecise points after starting process of a GPS unit? How do we define outliers?   
The automation of this process is limited and in cases with a manageable amount of tracks arbitrary decisions combined with local knowhow can help.

The question of segmentation with detecting breaks and way points was a major issue. A “break” has to be defined for each activity. On this base several approaches could be used and combined to develop algorithms: e.g. low velocity, small movement radius, large angle of sequent segments. Another approach is the use of point density. There have been developed several algorithms to find solutions for this question.

On the base of the segmentation of the tracks diverse interesting computations were presented. One special idea was the calculation of destination probability matrices (origo vs. destinations), which can be applied for definition of agents in an agent based model.

Finally we would like to thank all the participants for their valuable contributions and fruitful discussions which will help us to tackle the next challenges in the mafreina project. Additionally we would like to express our gratitude to the chair of the MOVE cost action Professor Rob Weibel and his team for providing the platform and for their support.