

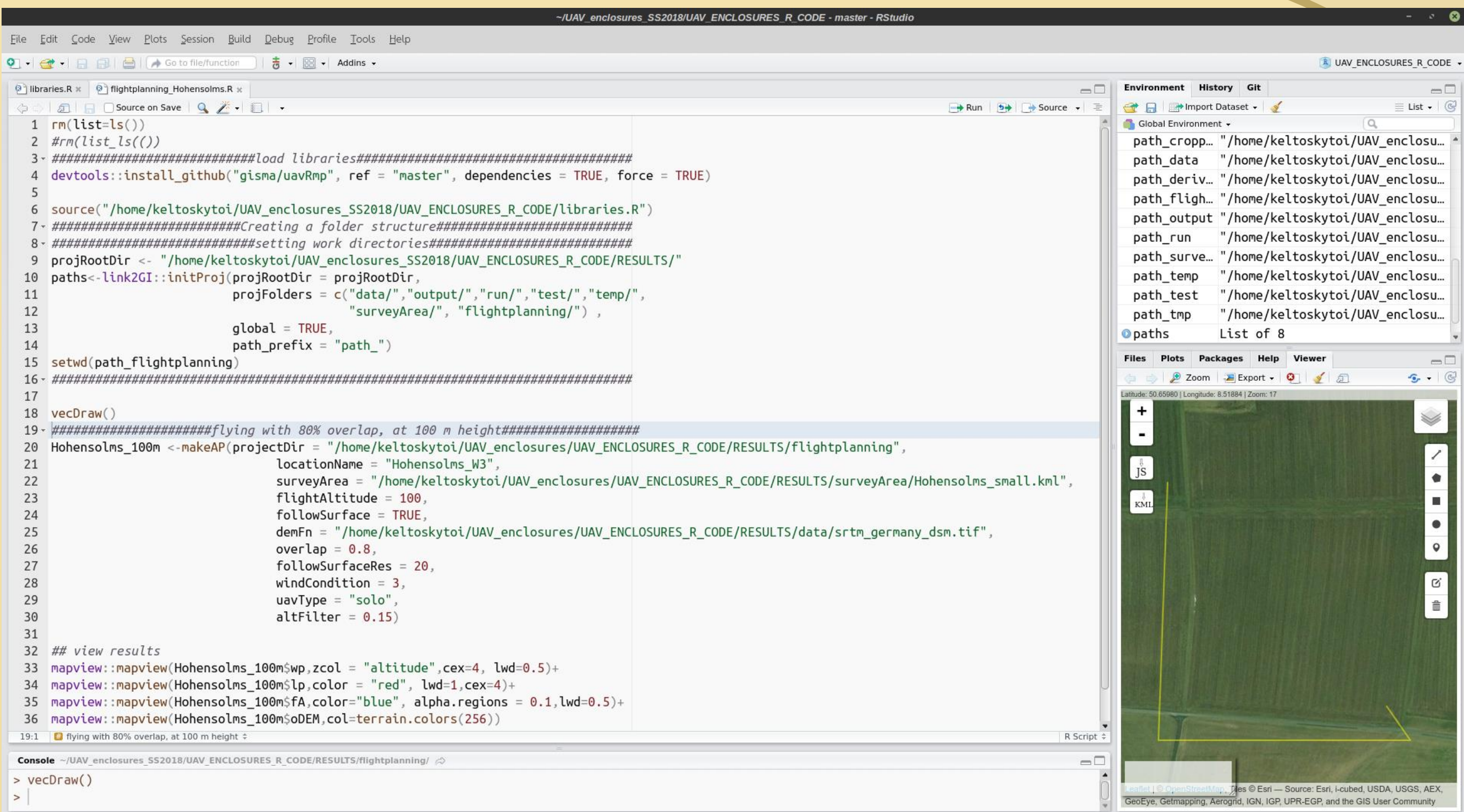
## OBJECTIVES

UAV-generated data for archeological fieldwork is becoming more and more an every-day trait. Often budget is a big problem to cope with either on hardware of software level. Low-budget RTF UAV systems are nowadays getting more stable and are compatible with open-source and open-access software. We would like to present a semi-automated workflow from data acquisition through data processing to data analysis with a low-budget RTF drone and an open-source, open-access and reproducible toolset.

## THE FUNCTIONALITIES OF THE TWIN- PACKAGES

### uavRmp – Level 1/Acquisition

- **vecDraw()** determines the **survey area** (P1, P2, P3, P4 (P4 =launching point)); saved as a *kml-file*
- setting **flightAltitude**
- **FollowSurface** = TRUE == providing a DTM or DSM
- FollowSurfRes + altFilter
- setting **windcondition** is crutial + **maxSpeed** + **maxFlightTime** → regulate the number control files
- **uavType** and **cameraType**



### uavRst – Level 2/Processing

- input: a UAV-derived RGB **Orthofoto** (processed in Agisoft Photoscan); data capture: **2018.06.15**
- digitazing **test-training areas** in **GIS software**

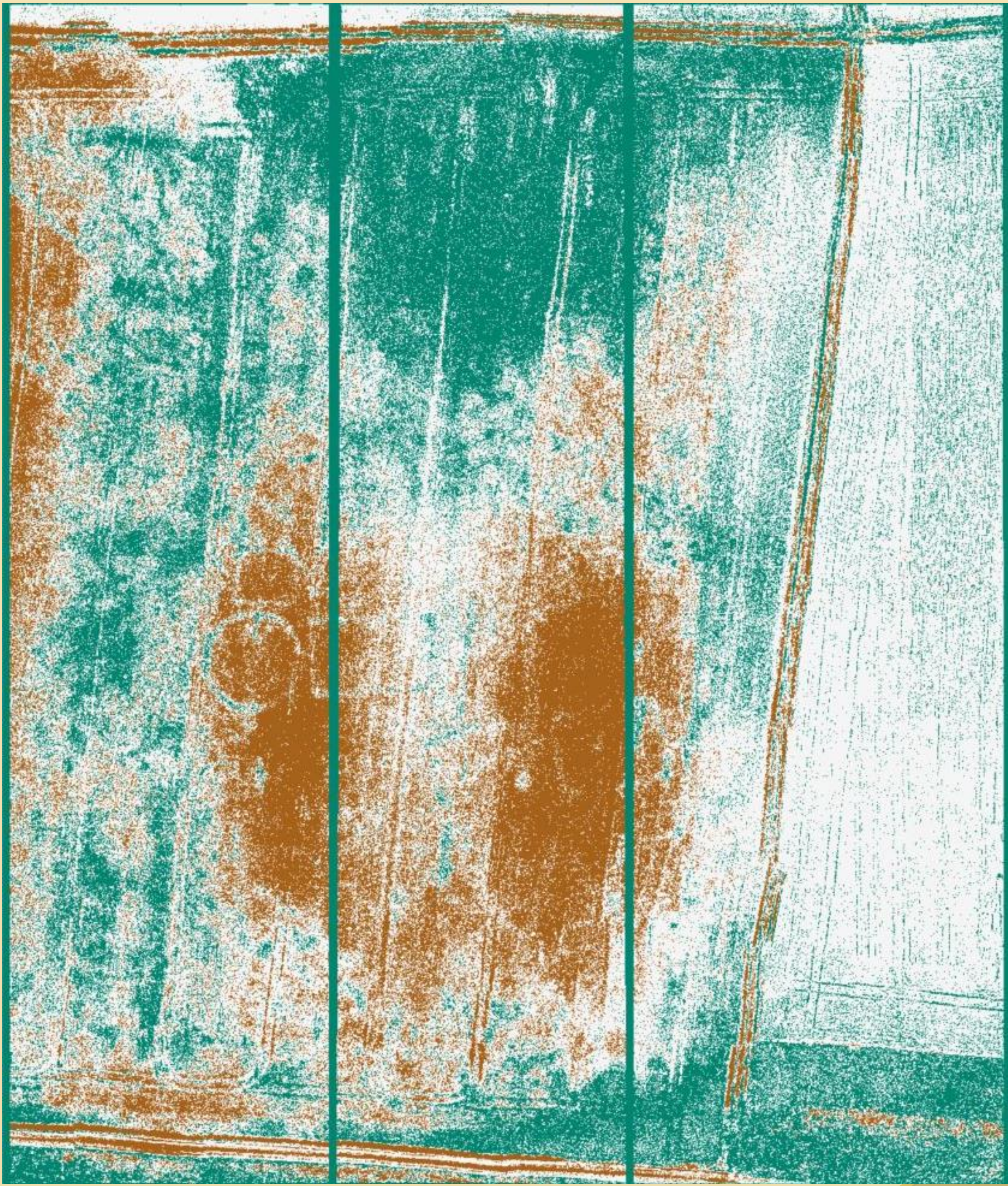


- 3 classes:**
- 1 - Cropmarks (brown)
  - 2 - yellow crop (white)
  - 3 - green crop (turquoise )

- calculating indices, morphologic filters and extracting statistics - **calc\_ext()**
- extraction of training pixel values
- training the model with *random forest* and *feature forward selection* method **ffs\_train()**

### uavRst – Level 3/Analysis

- classification/prediction output  
→it was just a test with basic training areas  
→it has to be **refined**



THE UAV-PACKAGE TWINS ARE A VERY POWERFUL ADDITION TO OPEN-SOURCE, REPRODUCIBLE AND OPEN-ACCESS TOOLS FOR ARCHAEOLOGICAL REMOTE SENSING DATA ACQUISITION, PROCESSING AND ANALYSIS.

ACKNOWLEDGEMENTS: The R-Package was developed by Chris Reudenbach, Environmental Informatics, Philipps-University Marburg. For the R-Packages see <https://github.com/gisma/uavRmp>; Meyer, H., - Reudenbach, Chr., - Hengl, T., - Katurij, M., - Nauss, T., Improving performance of spatio-temporal machine learning models using forward feature selection and target-oriented validation. Environmental Modelling & software 101 (2018) 1-9.