Andreas Klingler

- Agricultural Research and Education Centre Raumberg-Gumpenstein, Austria
- PhD student at University of Natural Resources and Life Sciences, Vienna
- Main focus:
  - Management and utilisation of Grassland
  - Modelling of grassland growth dynamics
  - Remote sensing of grassland vegetation

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Suitability of non-destructive yield and quality measurements on permanent grassland

28TH GENERAL MEETING OF EUROPEAN GRASSLAND FEDERATION

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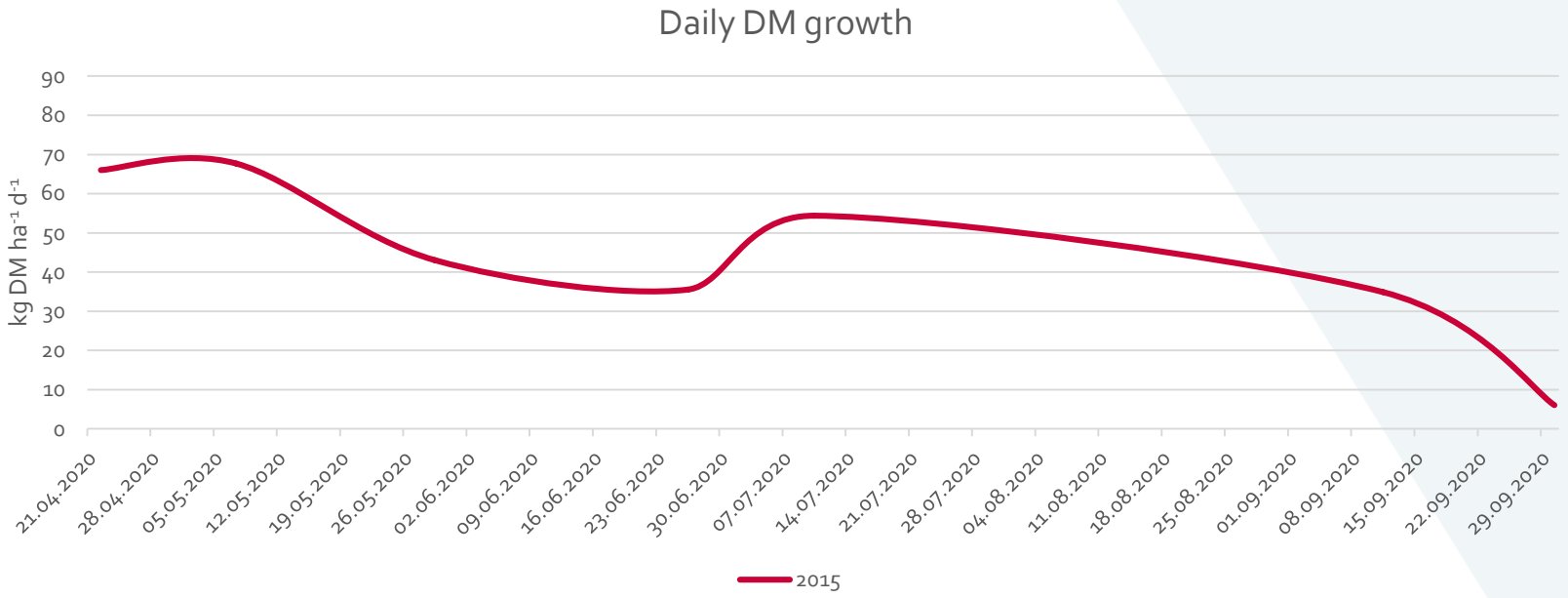
Klingler A.[1], Schaumberger A.[1], Vuolo F.[2] and Poetsch E.[1]

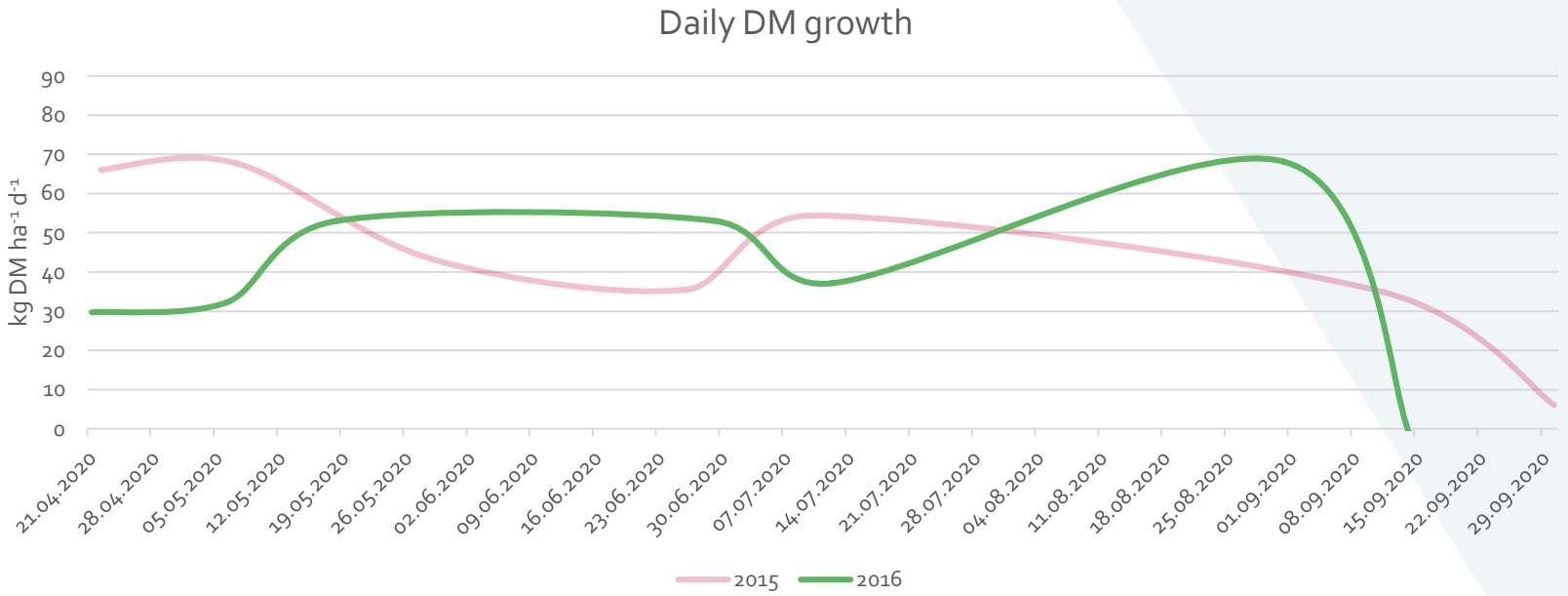
[1] Department of grassland management and cultural landscape, Agricultural Research and Education Centre, Raumberg-Gumpenstein

[2] Institute of Geomatics, University of Natural Resources and Life Sciences, Vienna

Grassland growth dynamics



Grassland growth dynamics



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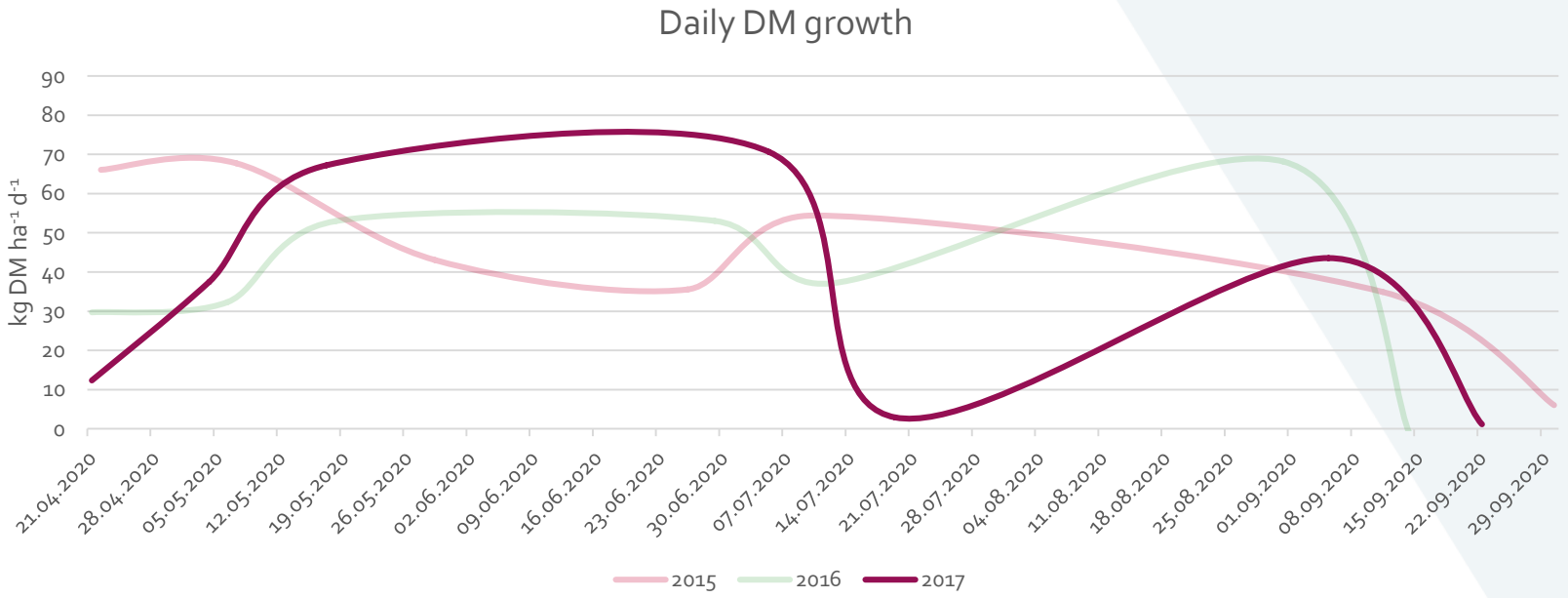
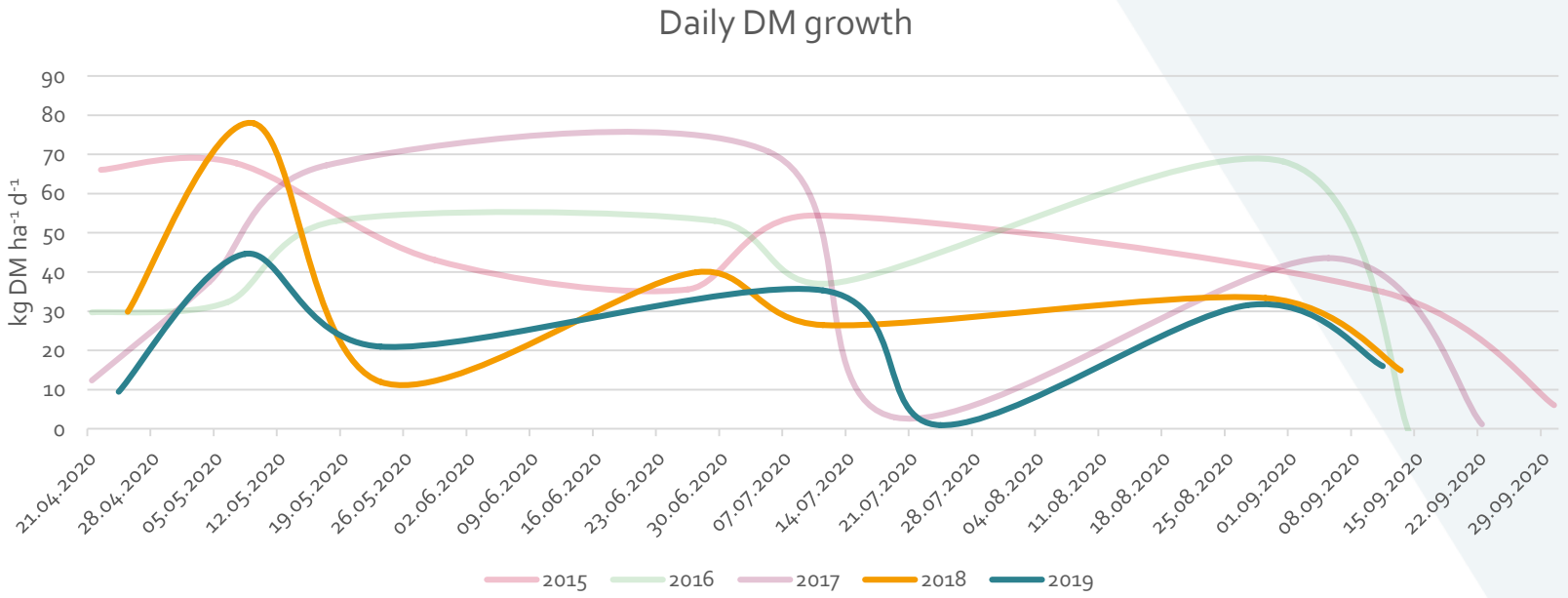
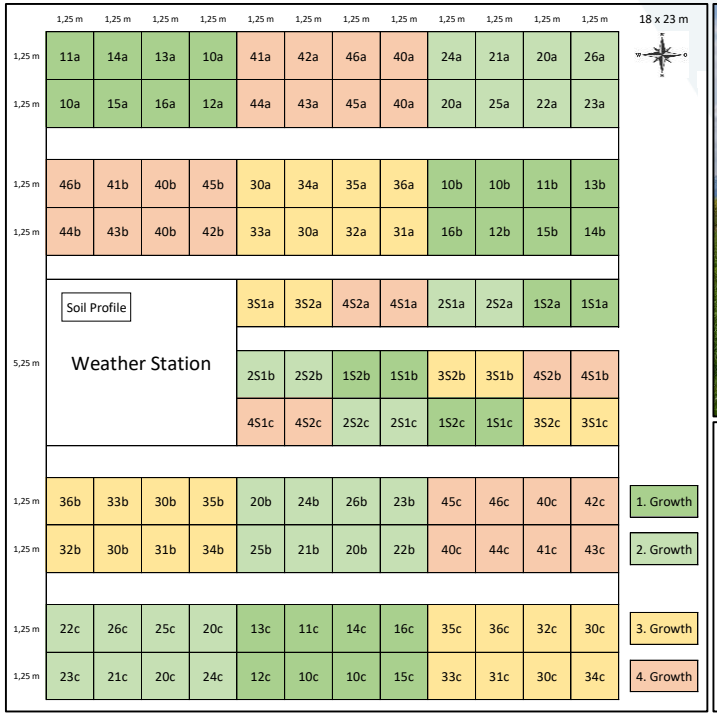


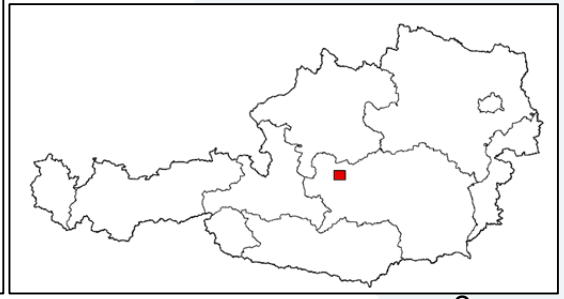
Grassland growth dynamics



Material and Methods

- Study year : 2018
- Split-plot design
  - Threefold repeated
  - Four cuts
  - Weekly sampling
- 32 campaigns

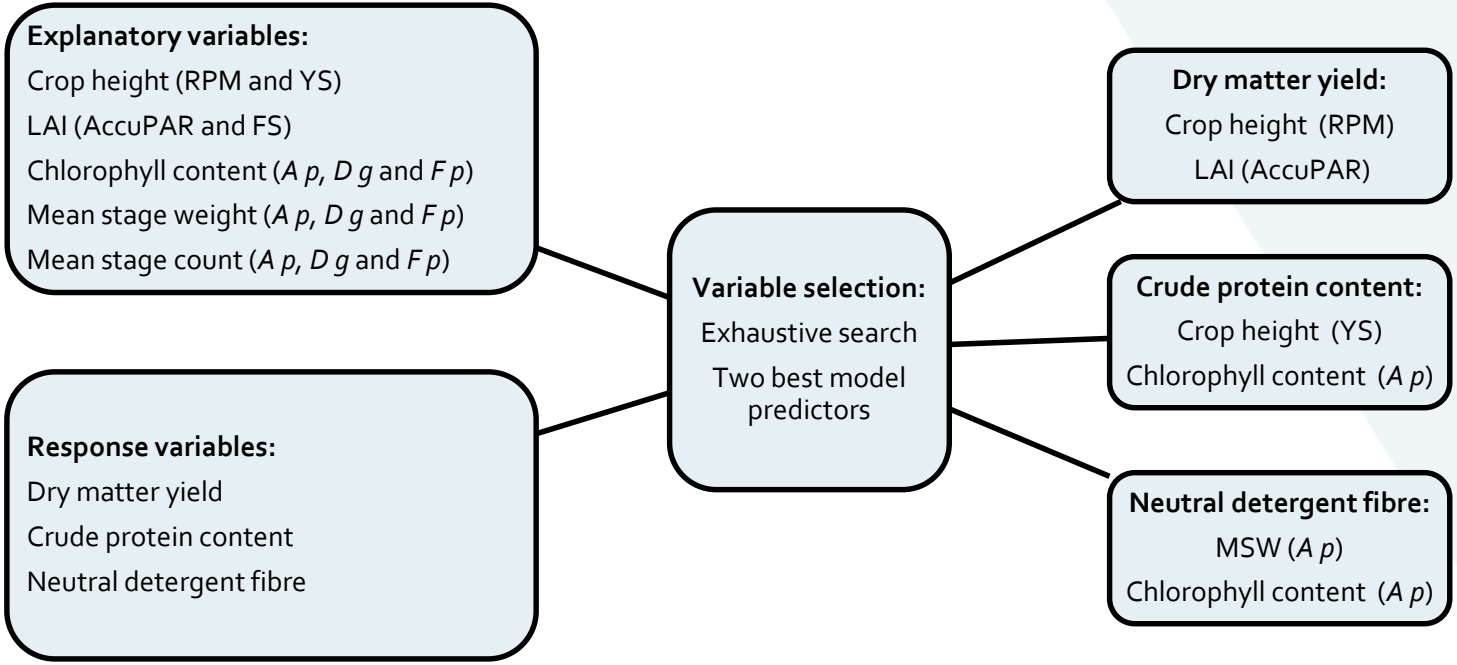




Measurement procedure

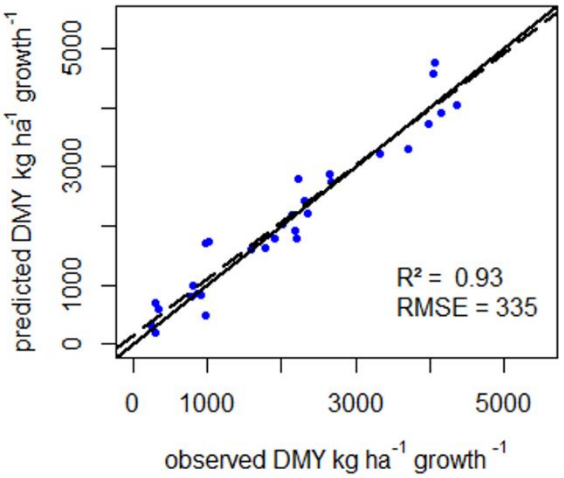
- Crop height
  - Rising plate meter and yard stick
- LAI readings
  - AccuPAR
  - Tec5 field spectrometer
    - Spectral resampling (Spectral response functions for Sentinel-2)
    - LAI calculation based on PROSPECT and SAIL
- Destructive harvest
- Individual plant harvest for mean stage count and mean stage weight:
  - 15 *Alopecurus pratensis*, 10 *Dactylis glomerata* and 5 *Festuca pratensis*
  - *Chlorophyll content (Spad meter)*
  - *Mean stage according to BBCH-scale* (Meier *et al.*, 2009)

Model selection



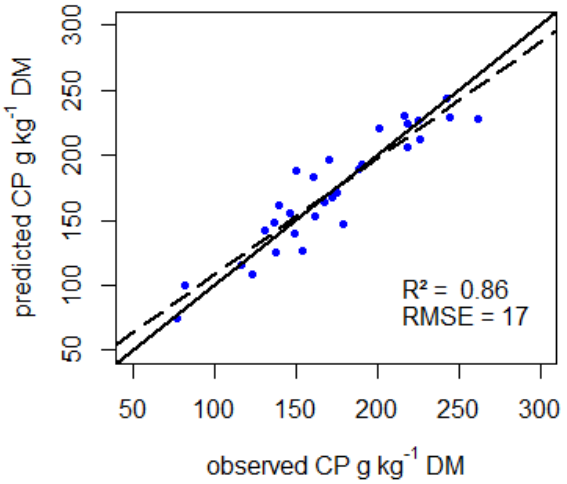
Results: Dry mater yield

- Best predictor
  - Crop height (RPM)
  - R^2: 0.90
  - RMSE: 434 kg ha^{-1}
- Two best predictors:
  - Crop height (RPM) and LAI (AccuPAR)
  - R^2: 0.93
  - RMSE: 335 kg ha^{-1}



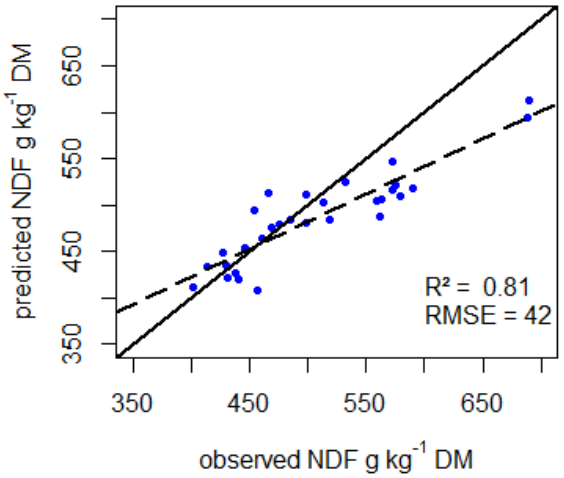
Results: Crude protein content

- Best predictor
  - Crop height (YS)
  - R^2: 0.75
  - RMSE: 22 g kg^{-1} DM
- Two best predictors:
  - Crop height (YS) and CC (*Alopecurus pratensis*)
  - R^2: 0.86
  - RMSE: 17 g kg^{-1} DM



Results: Neutral detergent fibre content

- Best predictor
  - MSC (*Festuca pratensis*)
  - R^2: 0.55
  - RMSE: 50 g kg^{-1} DM
- Two best predictors:
  - MSW and CC (both from *Alopecurus pratensis*)
  - R^2: 0.81
  - RMSE: 42 g kg^{-1} DM



Conclusion

- Non destructive measurements:
  - high ability to estimate important yield and quality parameters
  - predictor combinations led to significant accuracy improvements
  - high abundant plants and total sward
  - cost-efficiently and fast
- Continuous and comprehensive monitoring
  - small plots to regional scale
- Validation at several sites is needed

AREC
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Agriculture

University of Natural Resources
and Life Sciences, Vienna

AREC Raumberg-Gumpenstein

Division of grassland management and cultural landscape

University of Natural Resources and Life Sciences, Vienna

Institute of Geomatics

andreas.klingler@raumberg-gumpenstein.at