

GAFAG
an e-GEOS (ASI / Telespazio) Company

 **AgroSuite**

**Innovative Earth Observation Solutions in Support to
the Governmental and Insurance Sectors**

Peter Navratil

CAPIGI 2023

Amersfoort, 09.05.2023



Company Overview

Basic facts:

- Private sector company, located in Munich (headquarters) and Neustrelitz (branch)
- More than 35 years of expertise in geo-information services
- Today ~ 230 staff members
- Demand driven & Data & Technology agnostic

Specialised in:

- EO data reception, distribution, processing
- Value adding and data analytics
- Geo-information software, services and solutions
- International project consulting in > 100 countries

Realised GAF projects



AgroSuite – Modular and flexible Solutions for Sustainable Agriculture

- Supporting Governments with the European Common Agricultural Policy
- Accurate Yield Estimation, even under Extreme Events
- High-resolution historic and current Soil Moisture at different Soil depths
- Novel Insurance Product Design to reduce Production Risk
- Risk Assessments and Portfolio Monitoring in Insurance and Finance



Supporting Governments with the Implementation of the European Common Agricultural Policy

- EU CAP supports 7 million farmers with ~ € 60 billion subsidy payments / year
- Established Control System (IACS) with incremental utilisation of Remote Sensing
- CAP2023: Reformation, modernization and optimization of the system
- Continuous and comprehensive monitoring of all applications and parcels

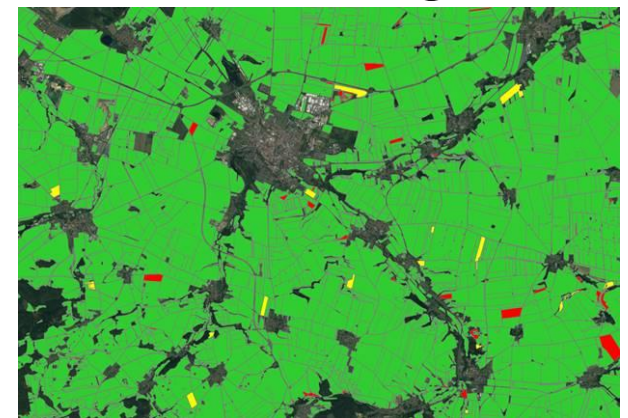
EU CAP



LPIS



Monitoring



LaFIS® – Geoinformation Systems for Agricultural Administrations

What?

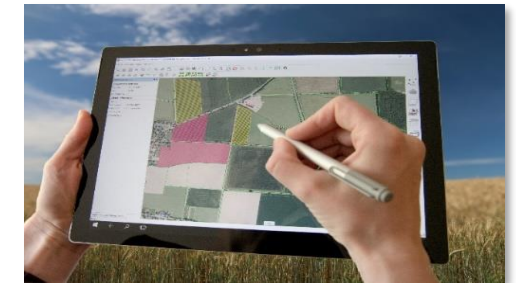
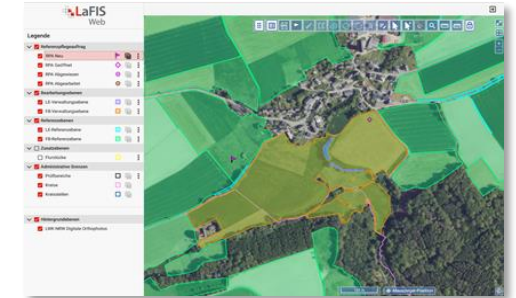
- Tailored administrative GIS solutions for the mandatory inclusion of GIS technologies in the Common Agricultural Policy (IACS-GIS)
- Management of the Land Parcel Identification System (LPIS) and on-site inspections including monitoring results

Benefits

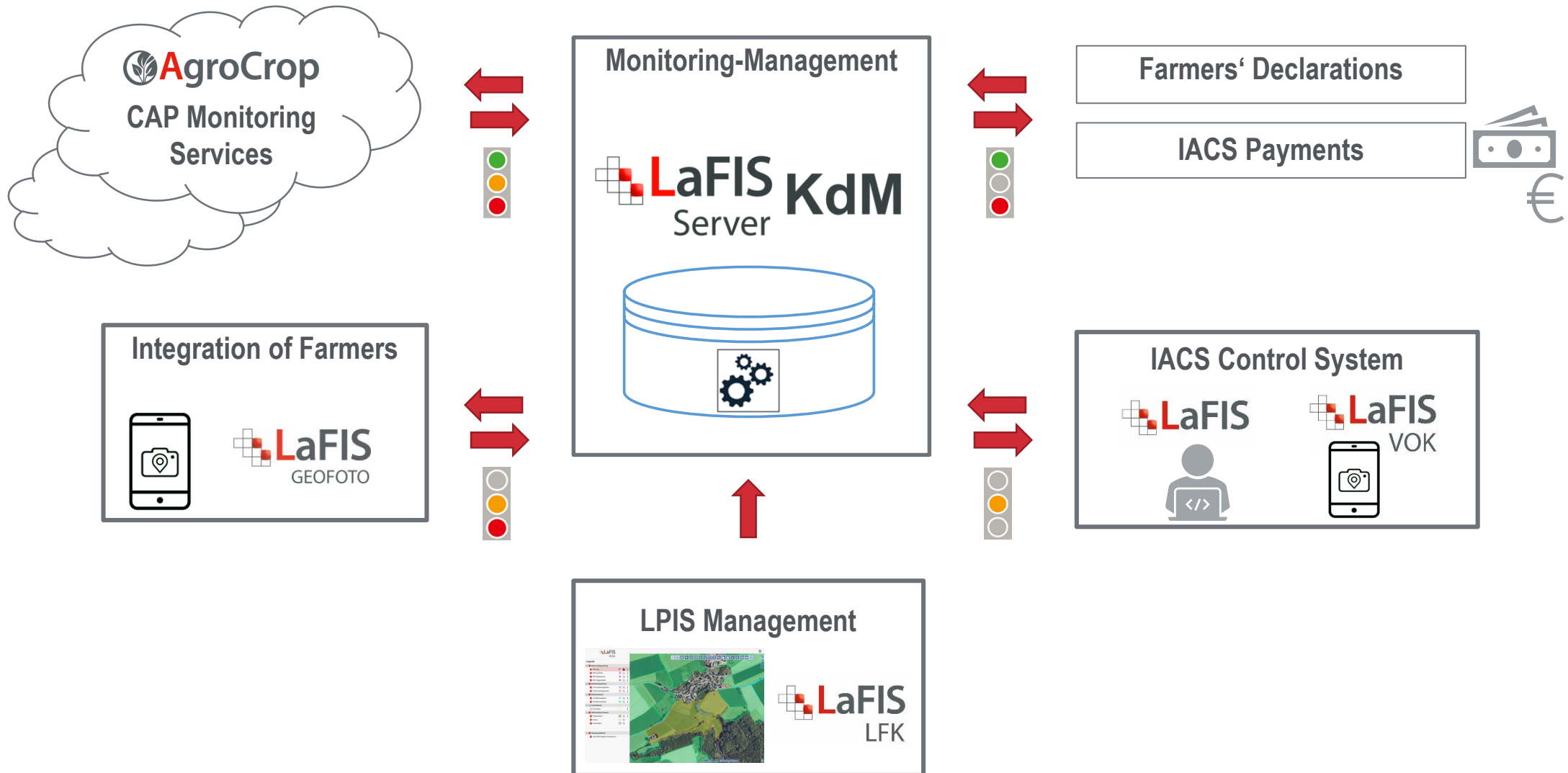
- Compliance with the applicable legislations and standards
- Various platforms: online and offline desktop clients, web client and apps
- Customized solutions

Challenges

- Adaptation to continuous changes in the respective EU regulations, national implementations and individual customer requirements



GAF Products and Services for CAP 2023



AgroCrop – European Common Agricultural Policy Monitoring Scenarios



Crop Classification



Agricultural Activity



Minimum Activity



Grassland Conversion



Catch Crops



Ploughing,
Sowing & Harvest



Grassland Mowing Detection



Detection of Ineligible Area



Homogeneity



Land Use Change



Fallow Land Management



Harvest of EFA-Nitrogen
Fixing Crops



Compliance with
Greening Obligations



Stripe Distinction

AgroYield – Reliable & Robust Yield Modeling

Strengths

- Accurate, flexible and cost-efficient Yield Modeling approach
- Scalability to crops and regions

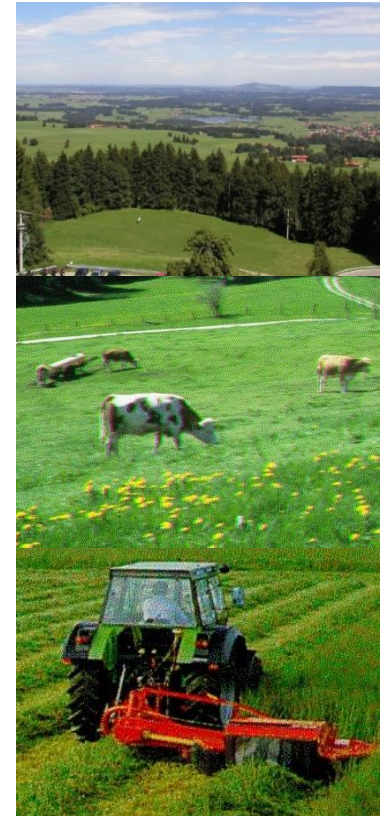
State of the Art

- Combines different Machine Learning models into a sophisticated model
- Data sources: Remote Sensing, Weather, Soil and further Datasets

Benefits

- Loss Estimation, with Yield Estimates up to 1-2 Months prior to harvest
- Reliable detection of Yield Variation, even under Extreme Events
- Higher Precision in Loss Assessment

Patent Pending



AgroSoil – Global & Accurate Soil Moisture Analytics



Global Demand for Soil Moisture Data with high Spatial, Temporal and Vertical Resolution



Tailored Soil- and Crop-specific Modelling Process targeting the full rootzone (0-100 cm depth)

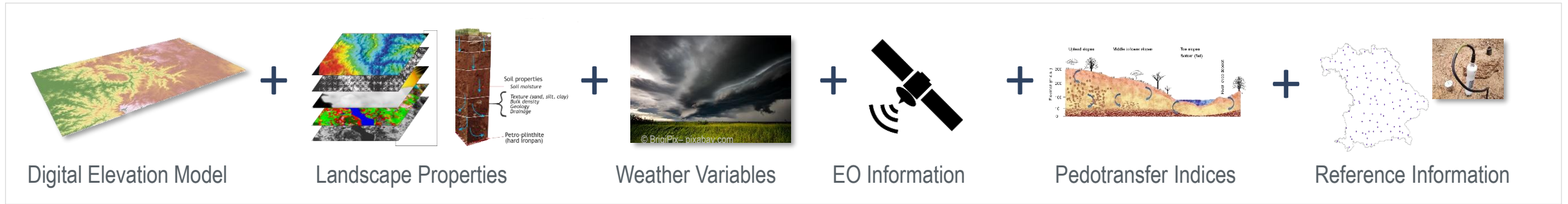


Builds upon global research coupling top-notch Process-based and Machine Learning Disaggregation Models

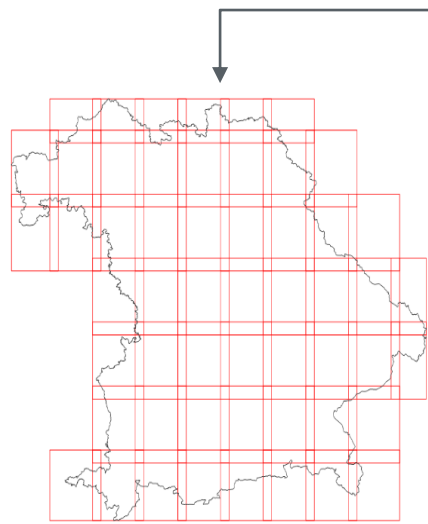


AgroSoil is the first Soil Moisture product to provide full-rootzone Soil Moisture at high Spatial Resolution

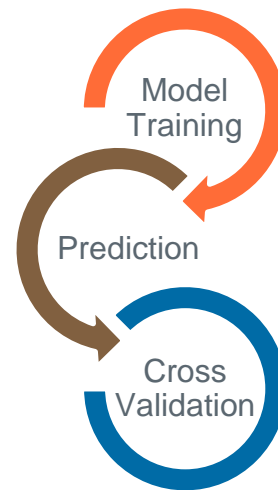
Replicative Modelling Framework within Cloud Infrastructure



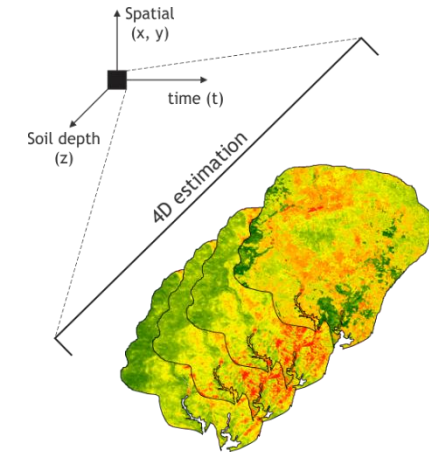
Cloud Infrastructure



Spatio-Temporal Data Cubes



Machine Learning



Soil Moisture

Key Facts and Figures

Fully automated cloud-based process-chain using Earth Observation and Ground Measurements

- **Spatial Resolution**
 - High (≤ 30 m)
 - Low (100 m – 500 m)
- **Temporal Resolution**
 - Daily to Seasonal
 - <48 hour latency
- **Vertical Resolution**
 - 5, 15, 30, 60 and 100 cm
 - Aggregated depth (e.g. 0-50 cm)
- **Available Time Frames**
 - From 1981 until present



© DreamQuest- pixabay.com

AgroFin[®] – Flexible Index Insurance Product Design

What?

- AgroFin is a flexible tool for analysing and designing Index Insurance Products based on EO and Weather Data

How?

- Provides direct access to a variety of global EO-based Underlyings
- Flexible interface for Index Insurance cover design
- State-of-the-art Risk Assessment methodology

For Whom?

- Agriculture and Financial Sectors
- Public Sector

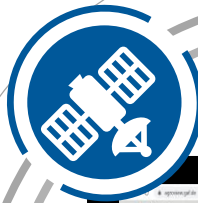
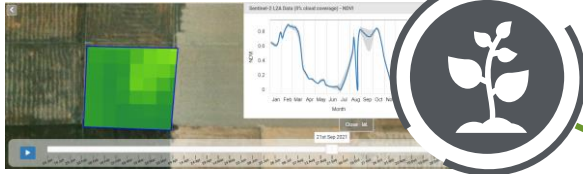


AgroView® – Tailored Insurance Support

AgroView®

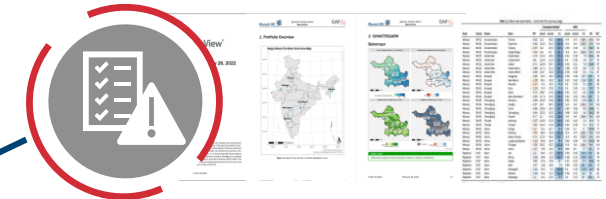
Crop Health Monitoring

Satellite-based index to monitor crop (Health, Stress and Acreage)



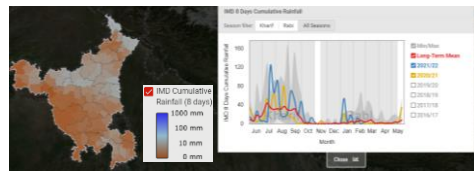
Reports & Alerts

Automated Client-wise fortnightly Portfolio Report and Alerts



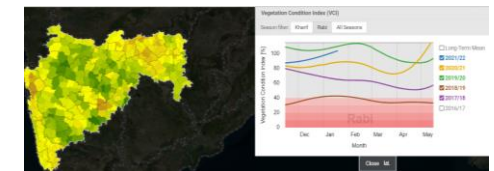
Weather Monitoring

Satellite-based Rainfall & IMD gridded data are integrated



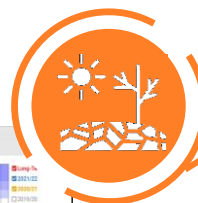
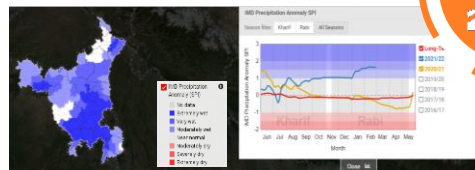
Manpower Management

Deploy Ground Manpower to Area of Concern



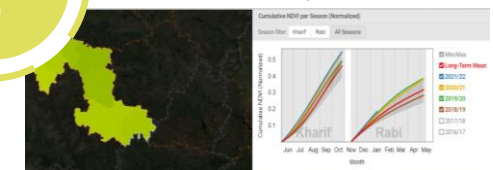
Drought Monitoring

Meteorological Drought and Agricultural Drought



Loss Estimation

Current year Crop Status & comparison to past years



AgroSuite – In a Nutshell

- State-of-the-Art Earth Observation and Geospatial Analytics
- Global Applicability
- Scalability
- High Adaptability to User and Market Requirements
- Fully Cloud-based for Reliability, Performance and Cost-efficiency



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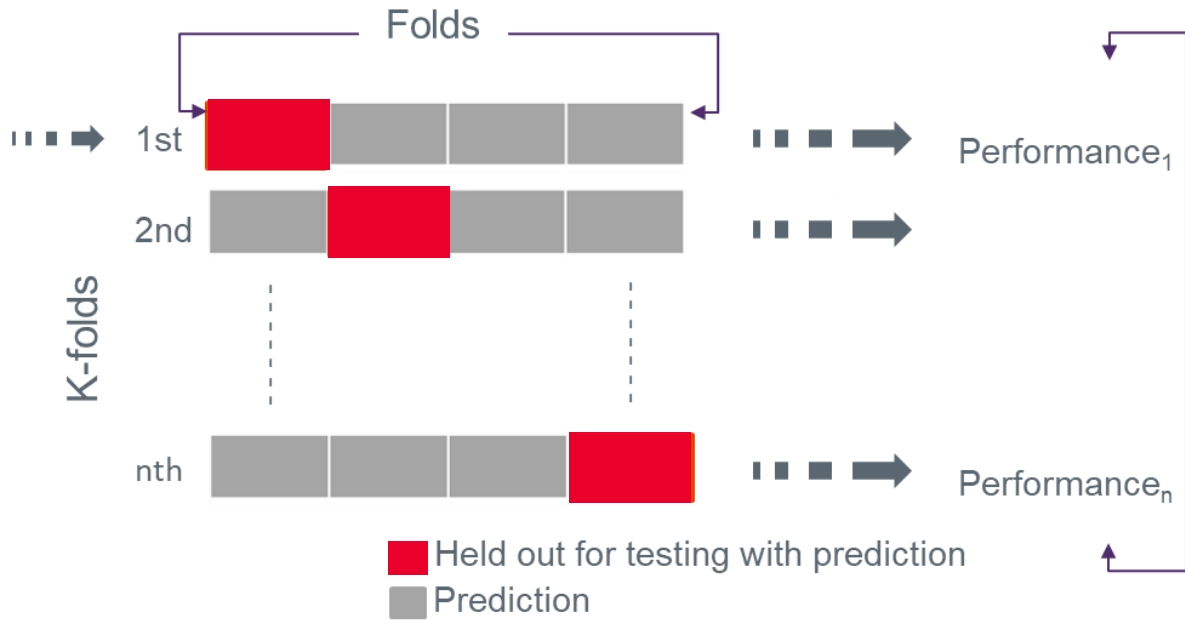
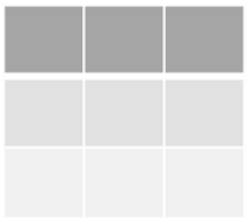
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Validating the AgroSoil Modelling Framework

Regression Matrix



K-fold cross validation - leave location time out
(Meyer et al. 2018)

$R^2 = 0.96$
RMSE = 0.015
Ghana
(In situ Source)

$R^2 = 0.88$
RMSE = 0.025
Germany
(EO Source)

