

Dr. Sarah Asam

CURRENT PROJECT WORK

- **TIMELINE - TIME** Series Processing of Medium Resolution Earth Observation Data assessing Long -Term Dynamics In our Natural Environment
- **GrassAM** – Grassland Monitoring in Armenia
- **FPCUP** - Framework Partnership Agreement on Copernicus User Uptake: Downstream Service/Application Development for Monitoring of Environmental Indicators

EDUCATION

- **Dissertation (Dr. rer. nat.)** at the University of Wuerzburg, Remote Sensing Unit, in cooperation with the German Aerospace Center (DLR) (2014).
- Fellow of the **Helmholtz Research School** "Mechanisms and Interactions of Climate Change in Mountain Regions" (Karlsruhe Institute of Technology, Garmisch-Partenkirchen) (2012 - 2014).
- **Master degree** (M.Sc.) in Global Change Ecology at the Department of Geography of the University of Bayreuth (Germany) (2010).
- **Bachelor degree** (B.A.) in Human Geography and Area Studies at the Department of Geography of the University of Erlangen-Nuernberg (Germany) (2007).

EMPLOYMENT RECORD

- **03/2017 - present** Research Associate at the German Remote Sensing Data Center (DFD), German Aerospace Center (DLR), Oberpfaffenhofen, Germany.
- **08/2014 – 08/2017** Senior Researcher at the Institute for Earth Observation at Eurac Research, Bozen/Bolzano (Italy).
- **10/2010 - 07/2014** Research assistant at the Department of Remote Sensing, University of Würzburg (Germany).

RESEARCH TOPICS

- Grasslands and agricultural land use
- Mountain regions
- Phenology and vegetation dynamics
- Global change and land surface – climate interactions
- Time-series analysis of medium and high resolution optical remote sensing data
- Retrieval of bio-physical vegetation parameters
- Optical and Thermal Image processing

PUBLICATIONS

Peer-reviewed Journals

- Misra, G., **Asam**, S., Menzel, A. (2021): Ground and satellite phenology in alpine forests are becoming more heterogeneous across higher elevations with warming, Agricultural and Forest Meteorology 303, 108383, DOI: 10.1016/j.agrformet.2021.108383.
- Xie, J., Hüsler, F., de Jong, R., Chimani, B., **Asam**, S., Sun, Y., Schaepman, M.E., Kneubühler, M. (2021). Spring temperature and snow cover climatology drive the advanced springtime phenology (1991–2014) in the European Alps. Journal of

Geophysical Research: Biogeosciences, 126, e2020JG006150. DOI: 10.1029/2020JG006150

- Ahlswede, S., **Asam**, S., Röder, A. (2021): Hedgerow object detection in very high-resolution satellite images using convolutional neural networks. *J. Appl. Remote Sens.* 15(1), 018501, DOI: 10.1117/1.JRS.15.018501.
- Holzwarth, S., Thonfeld, F., Abdullahi, S., **Asam**, S., Da Ponte Canova, E., Gessner, U., Huth, J., Kraus, T., Leutner, B., Kuenzer, C. (2020): Earth Observation based Monitoring of Forests in Germany: a Review. *Remote Sensing* 12(21), 3570. DOI: 10.3390/rs12213570
- Schucknecht, A., Krämer, A., **Asam**, S., Mejia-Aguilar, A., Garcia-Franco, N., Schuchardt, M. A., Jentsch, A., Kiese, R. (2020): Vegetation traits of pre-Alpine grasslands in southern Germany. *Sci Data* 7, 316 (2020). DOI: 10.1038/s41597-020-00651-7.
- Reinermann, S., **Asam**, S., Kuenzer, C. (2020): Remote Sensing of Grassland Production and Management—A Review. *Remote Sensing* 12(12), 1949, DOI:10.3390/rs12121949.
- Xie, J., Jonas, T., Rixen, C., de Jong, R., Garonna, I., Notarnicola, C., **Asam**, S., Schaepman, M. E., Kneubühler, M., (2020): Land surface phenology and greenness in Alpine grasslands driven by seasonal snow and meteorological factors, *Science of The Total Environment*, 725,138380, DOI:10.1016/j.scitotenv.2020.138380.
- Reinermann, S.; Gessner, U.; Asam, S.; Kuenzer, C.; Dech, S. (2019): The Effect of Droughts on Vegetation Condition in Germany: An Analysis Based on Two Decades of Satellite Earth Observation Time Series and Crop Yield Statistics, *Remote Sensing* 11(15), 1783, DOI:10.3390/rs11151783
- Rossi, M., Niedrist, G., **Asam**, S., Tonon, G., Tomelleri, E., Zebisch, M. (2019): A Comparison of the Signal from Diverse Optical Sensors for Monitoring Alpine Grassland Dynamics, *Remote Sens.* 2019, 11(3), 296, DOI:10.3390/rs11030296
- **Asam**, S.; Callegari, M.; Matiu, M.; Fiore, G.; De Gregorio, L.; Jacob, A.; Menzel, A.; Zebisch, M.; Notarnicola, C. (2018): Relationship between Spatiotemporal Variations of Climate, Snow Cover and Plant Phenology over the Alps—An Earth Observation-Based Analysis. *Remote Sens.*, 10, 1757. DOI:10.3390/rs10111757
- Misra, G., Buras, A., Heurich, M., **Asam**, S., Menzel, A. (2018): LiDAR derived topography and forest stand characteristics improve the understanding of the spatial variability observed in MODIS land surface phenology. *Remote Sensing of Environment* 218, 231-244, DOI:10.1016/j.rse.2018.09.027
- Batsaikhan, A.; **Asam**, S.; Klein, D.; Conrad, C. (2017): Analysis of grassland phenology at different site conditions using webcams - A case study in the European Alps. *Journal of the Japan Society of Photogrammetry and Remote Sensing*, 56 (4), Seiten 137-142. DOI:10.4287/jsprs.56.137
- Pasolli, L., Notarnicola, C., Castelli, M, **Asam**, S., Bruzzone, L., Zebisch, M., Wohlfahrt, G. (2015): Retrieval of leaf area index in mountain grasslands in the Alps from MODIS satellite imagery. *Remote Sensing of Environment* 165, p. 159-174. DOI: 10.1016/j.rse.2015.04.027
- Lex, S., **Asam**, S., Löw, F., Conrad, C. (2015): Comparison of two statistical methods for the derivation of the fraction of absorbed photosynthetic active radiation for cotton. *Photogrammetrie, Fernerkundung, Geoinformation* 1, p. 55 – 67. DOI: 10.1127/pfg/2015/0250
- **Asam**, S., Fabritius, H., Klein, D., Conrad, C., and Dech, S. (2013) Derivation of leaf area index for grassland within alpine upland using multi-temporal RapidEye data, *International Journal of Remote Sensing* 34 (23), 8628-8652. DOI: 10.1080/01431161.2013.845316

Conference contributions

- Reiner mann, S., Gessner, U., **Asam**, S., Kuenzer, C. (2021): Satellite time series-based analyses of grassland use intensity and yields, 21st Symposium of the European Grassland Federation (EGF 2021), 17-19 May 2021, Kassel (online).
- Schucknecht, A. Seo, B., Reiner mann, S., Krämer, A., **Asam**, S., Atzberger, C., Kiese, R. (2021): From the field to the region – monitoring pre-Alpine grassland characteristics at different spatial scales, 21st Symposium of the European Grassland Federation (EGF 2021), 17-19 May 2021, Kassel (online).
- Schucknecht, A., Seo, B., Krämer, A., **Asam**, S., Mejia Aguilar A., Kiese, R. (2020): Estimation of grasslands traits with multispectral UAS data – a comparison of different sensors and models, 40. Wissenschaftlich-Technische Jahrestagung der Deutschen Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation, 4-6 March 2020, Stuttgart, Germany
- Bachmann, M., **Asam**, S., Frey, C., Klein, I., Eisfelder, C., Plank, S., Klüser, L., et al. (2019): "TIMELINE" AVHRR Re-Processing, CEOS WGCV IVOS 31, 25 – 29 March 2019, Perth, Australia.
- **Asam**, S.; Da Ponte, E.; Köstl, T.; Wuttej, D.; Abbasov, S.; Köppler, M.; (2019): Mapping Grassland Extent and Degradation in Azerbaijan, ESA Living Planet Symposium 2019, 13-17 May 2019, Milan, Italy.
- **Asam**, S., Reiners, P., Frey, C., Sobrino, J., Göttsche, F.-M., Bendix, J., Kuenzer, C. (2019): Validation of the TIMELINE AVHRR Land Surface Temperature (LST) Product with MODIS and in situ LST, ESA Living Planet Symposium 2019, 13-17 May 2019, Milan, Italy.
- Reiner mann, S., **Asam**, S., Gessner, U., Kuenzer, C., Dech, S. (2019): Extreme Hot and Dry Summers in Germany - Analysis of Long-term Earth Observation Time Series of Vegetation Condition, ESA Living Planet Symposium 2019, 13-17 May 2019, Milan, Italy.
- Rossi, M., **Asam**, S., Niedrist, G., Verrelst, J., Zebisch, M. (2019): Detecting harvest events and estimating biomass production on alpine grasslands - A multisensor approach, ESA Living Planet Symposium 2019, 13-17 May 2019, Milan, Italy.
- Krämer, A., Schucknecht, A., **Asam**, S., Kiese, R. (2019) Mapping vegetation parameters in pre-Alpine and Alpine grasslands with multispectral sensors. BONARES Status Seminar 2019, 19.-21.2.2019, Leipzig
- Mejia-Aguilar, A., Rossi, M., Niedrist, G., **Asam**, S., Tonon, G., Zebisch, M., Notarnicola, C. (2018): „Close range methods to monitor vegetation dynamics on a dry alpine mountain grassland over different spatial and temporal scales“. Whispers Conference 2018, 23.-26. September 2018, Amsterdam, Netherlands.
- Rossi, M., **Asam**, S., Niedrist, G., Tonon, G., Zebisch, M. (2018): „Monitoring alpine grassland dynamics with optical sensors on multiple spatial scales“. International SUSALPS Conference, 18. - 20. September 2018, Garmisch-Partenkirchen.
- Greifeneder, F., **Asam**, S., Castelli, M., Notarnicola, C., Rossi, M., Stendardi, L. (2018): "Monitoring of Alpine grasslands with multitemporal optical and radar remote sensing". International SUSALPS Conference, 18. - 20. September 2018, Garmisch-Partenkirchen.
- Rossi, M., Niedrist, G., **Asam**, S., Tonon, G., Zebisch, M. (2018): "Optical Responses on multiple spatial scales for assessing vegetation dynamics – a case study for alpine grasslands". IGARSS Conference Proceedings 2018, 23 – 27 July 2018, Valencia, Spain
- Halle, W., **Asam**, S., Borg, E., Fischer, C., Frauenberger, O., Lorenz, E., Klein, D., Nolde, M., Paproth, C., Plank, S., Richter, R., Säuberlich, T., Soszynska, A., Strobl, C. (2018): Firebird – Small Satellite For Wild Fire Assessment, International Geoscience and Remote Sensing Symposium, IGARSS 2018, 23 – 27 July, 2018, Valencia, Spain.
- **Asam**, S., Gessner, U., Richter, R., Klein, D., Fischer, C. (2018): Detection of Land Surface Temperature Patterns in Thuringia, Germany, Using Atmospherically

Corrected FireBIRD/TET-1 Data, 38th Annual EARSeL Symposium 9-12 July 2018, Chania, Greece.

- **Asam**, S., Eisfelder, C., Klein, I., Künzer, C. (2018): Time Series Analysis Over Europe From AVHRR Data – Examples From The TIMELINE Project, 3rd joint EARSeL LULC & NASA LCLUC Workshop 11-12 July 2018, Chania, Greece.
- Klein, D.; Fischer, C.; **Asam**, S.; Plank, S.; Nolde, M.; Richter, R.; Soszynska, A.; Strobl, C.; Frauenberger, O.; Lorenz, E.; Halle, W. (2018): Data from the DLR FireBIRD mission, EARSeL Symposium 2018, 9-12 July 2018 Chania, Crete, Greece.
- **Asam**, S.; Callegari, M.; Jacob, A.; Notarnicola, C. (2018): Understanding Spatiotemporal Vegetation Patterns and Phenology Over the Alps Based on Medium Resolution Satellite Remote Sensing Data, EO4Alps Workshop, 27-29 June 2018, Innsbruck, Austria
- Rossi, M., Niedrist, G., **Asam**, S., Tonon, G., Zebisch, M. (2018): Monitoring alpine grassland dynamics with optical sensors on multiple spatial scales, EO4Alps Workshop, 27-29 June 2018, Innsbruck, Austria
- Schucknecht, A., Krämer, A., **Asam**, S., Kiese, R. (2018): "Analysing the Potential of Multispectral Sensors to Map Vegetation Parameters in Pre-Alpine and Alpine Grasslands", EO4Alps Workshop, 27-29 June 2018, Innsbruck, Austria
- Klein, D.; Fischer, C.; **Asam**, S.; Plank, S.; Nolde, M.; Richter, R.; Soszynska, A.; Strobl, C.; Frauenberger, O.; Lorenz, E.; Halle, W. (2018): Die Detektion von Thermalanomalien und Thermalmustern mit Hilfe der Daten der DLR- FireBIRD-Mission. Symposium „Neue Perspektiven der Erdbeobachtung“, 25 – 27 June 2018, Köln
- Castelli, M.; **Asam**, S.; Jacob, A.; Zebisch, M.; Notarnicola, C. (2018): Monitoring daily evapotranspiration in the Alps exploiting Sentinel-2 and meteorological data Remote Sensing and Hydrology Symposium (ICRS-IAHS), May, 8-10, 2018, Cordoba, Spain.
- Rossi, M., Niedrist, G., **Asam**, S., Tonon, G. Zebisch, M (2018) Monitoring Vegetation Dynamics and Stress with Optical Sensors: A study of Alpine Grasslands among Multiple Spatial Scales, European Geosciences Union General Assembly 2018, 8–13 April 2018, Vienna, Austria.
- Eisfelder, C.; **Asam**, S.; Frey, C.; Kuenzer, C.; Dech, S. (2018): Time-series processing of AVHRR data for NDVI product generation – an example from the TIMELINE project, PFGK18 : Photogrammetrie - Fernerkundung - Geoinformatik - Kartographie Tagung 2018, March 7-9, 2018, Munich, Germany.
- **Asam**, S., Matiu, M., Callegari, M., Fiore, G., De Gregorio, L., Jacob, A., Menzel, A., Notarnicola, C. (2017): Spatiotemporal variations of alpine climate, snow cover and phenology. 9th International Workshop on the Analysis of Multitemporal Remote Sensing Images, 27-29 June 2017, Bruges, Belgium.
- Notarnicola, C.; **Asam**, S.; Jacob, A.; Marin, C.; Rossi, M.; Stendardi, L. (2017): Mountain crop monitoring with multitemporal Sentinel-1 and Sentinel-2 imagery. 9th International Workshop on the Analysis of Multitemporal Remote Sensing Images, 27-29 June 2017, Bruges, Belgium.
- **Asam**, S., Notarnicola, C., Niedrist, G. (2017): Comparison of Optimized Settings for Physical Leaf Area Index Derivation from Multiple Earth Observation Sensors in Alpine Grassland, EARSeL SIG Imaging Spectroscopy Workshop 2017, April 19 – 21, 2017, Zurich, Switzerland.
- Misra, G., Buras, A., **Asam**, S., Menzel A. (2017): Towards an improved Land Surface Phenology mapping using a new MODIS product: A case study of Bavarian Forest National Park. EGU General Assembly 2017, April 23 – 28, 2017, Vienna, Austria.
- **Asam**, S., Sonnenschein, R. (2017): Alpine-Wide Monitoring Of Vegetation Dynamics Based On Sentinel-2 Data, VAO Symposium 2017, March 28 – 31, 2017, Bolzano, Italy.
- Batsaikhan, A., **Asam**, S., Klein, D., Conrad, C. (2017): Monitoring Grassland Phenology In The Alps Using Webcams, VAO Symposium 2017, March 28 – 31, 2017, Bolzano, Italy.

- Batsaikhan, A.; Conrad, C.; **Asam**, S.; Klein, D. (2017) Analyzing the impact of snowmelt timing on grassland green-up dates in the European Alps using webcams. In: Conference Proceedings, Seiten 45-46. Japan Society of Photogrammetry and Remote Sensing (JSPRS) Fall Conference 2017, 09.-10.10.2017, Yamaguchi, Japan. DOI: NCID:AN00351250
- Batsaikhan, A., Conrad, C., Klein, D., **Asam**, S. (2016): Analyzing phenology of grassland along a transect through altitudinal zones using remote sensing. 5. gemeinsame Jahrestagung der Arbeitskreise Fernerkundung (DGfG) und Auswertung von Fernerkundungsdaten (DGPF), September 28 - 30, 2016, Halle/Saale, Germany.
- Matiu, M., **Asam**, S., Callegari, M., Notarnicola, C., Menzel, A. (2016): Spatiotemporal variations of climate, snow and vegetation in an Alpine region. Data Analysis and Modeling in Earth Sciences (DAMES) - Biannual international conference series, 26. - 28. September 2016, Hamburg, Germany.
- Notarnicola, C., **Asam**, S., Callegari, M., De Gregorio, L., Greifeneder, F., Marin, C., Sonnenschein, R., Zebisch, M. (2016): Monitoring ecosystems dynamics in alpine environments using Sentinel data, esa Living Planet Symposium 2016, 9. - 13. May 2016, Prague, Czech Republic.
- Tomelleri, E., **Asam**, S., Notarnicola, C., Wohlfahrt, G. (2016): Multi-scale estimates of ecosystem traits: a meta-model approach, esa Living Planet Symposium 2016, 9. - 13. May 2016, Prague, Czech Republic.
- Mejia-Aguilar, A., Tomelleri, E., **Asam**, S., Zebisch, M. (2016): UAV-based NDVI calculation over grassland: An alternative approach, EGU General Assembly 2016, 17. - 22. April 2016, Vienna, Austria.
- **Asam**, S., Notarnicola, C., Callegari, M., De Gregorio, L., Greifeneder, F., Costa, A., Jacob, A., Monsorno, R., Zebisch, M. (2015): Time series of remote sensing products adapted to Alpine areas: Snow cover, LAI, NDVI, and soil moisture, Virtual Alpine Observatory Symposium 2015, October 27 - 30, 2015, Salzburg, Austria.
- **Asam**, S., Staab, J., Callegari, M., Costa, A., De Gregorio, L., Greifeneder, F., Monsorno, R., Notarnicola, C (2015): Phenological monitoring based on biophysical remote sensing products adapted to alpine areas. Phenology 2015 Conference, 5-8 October 2015, Kusadasi, Turkey.
- Notarnicola, C., **Asam**, S., Callegari, M., Costa, A., De Gregorio, L., Greifeneder, F., Monsorno, R., Ventura, B. (2015): Alpine algorithms - Time series of innovative remote sensing products for alpine areas: snow cover, leaf area index, and soil moisture. 8th International Workshop on the Analysis of Multitemporal Remote Sensing Images, July 22 - 24, 2015, Annecy, France.
- **Asam**, S., Klein, D., Dech, S. (2015): Estimation of grassland use intensities based on high spatial resolution LAI time series. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-7/W3, 285-291, Mai 11 - 15, 2015, Berlin, Germany.
- **Asam**, S., Verrelst, J., Klein, D., Notarnicola, C. (2015): Leaf Area Index derivation from hyperspectral and multispectral remote sensing data in heterogeneous grassland. 9th EARSeL SIG Imaging Spectroscopy workshop, Luxembourg, 14-16 April 2015.
- **Asam**, S., Pasolli, L., Notarnicola, C., Klein, D. (2014): The potential of Sentinel-2 spatial resolution for LAI derivation in Alpine grasslands, SENTINEL-2 for Science Workshop, 20. - 22. May 2014, Frascati, Italy.
- **Asam**, S., Pasolli, L., Notarnicola, C., Klein, D. (2013): Comparison of leaf area indices for grasslands within the alpine uplands based on multi-scale satellite data time series and radiation transfer modeling. 7th International Workshop on the Analysis of Multi-temporal Remote Sensing Images, June 25 - 27, 2013, Banff, Canada.
- **Asam**, S., Klein, D., Dech, S. (2012): Comparison of leaf area index derived by statistical relationships and inverse radiation transport modeling using RapidEye data in the European alpine upland. Proc. SPIE 8531, Remote Sensing for

Agriculture, Ecosystems, and Hydrology XIV, 853103, September 24 – 27, 2012, Edinburgh, UK.

- **Asam, S.** (2011) Derivation of LAI from repeated in situ observations and multi-scale remote sensing data. In PhenoALP project final meeting, 12.-14. October 2011, Torgnon, Italy.
- **Asam, S., Klein, D., Zebisch, M., Kunstmann, H., and Dech, S.** (2011) A concept for deriving a spatial and temporal high resolution LAI from multi-scale remote sensing data, 3rd iLEAPS Science Conference, 18.-23. Sept. 2011, Garmisch-Partenkirchen, Deutschland.
- **Asam, S., Klein, D., Geßner, U., Conrad, C., Beierkuhnlein, C., Dech, S.** (2010): Ableitung des Vegetationsbedeckungsgrades aus multiskaligen Fernerkundungsdaten für hydrologische Modellierung in Zentralasien. Angewandte Geoinformatik 2010, July 7 – 9, 2011, Salzburg, Austria.
- Klein, D., **Asam, S.**, Gessner, U., and Dech, S. (2011) Assessment of mountainous ecosystems in Central Asia by using remote sensing based vegetation cover fractions. In 34rd International Symposium on Remote Sensing of Environment, 10-15 April 2011, Sydney, Australia.

PhD thesis

- **Asam, S.** (2014): Potential of high resolution remote sensing data for Leaf Area Index derivation using statistical and physical models. Doctoral Thesis. University of Würzburg. Germany. URN: <http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:bvb:20-opus-108399>