

## Dr. Christian Geiß

### RESEARCH INTERESTS

- Development of machine learning algorithms for interpretation of earth observation data
- Multimodal remote sensing of built environments
- Analysis of exposure and vulnerability in the context of natural hazards
- Automated techniques for damage mapping after natural catastrophes

### SELECTED PUBLICATIONS (ISI-LISTED JOURNALS)

*published or in press*

- [24] **Geiß, C.**, Aravena Pelizari P., Bauer, S., Schmitt, A., and Taubenböck, H. (): Automatic Training Set Compilation with Multisource Geodata for DTM Generation from the TanDEM-X DSM. *IEEE Geoscience and Remote Sensing Letters*, in press.
- [23] **Geiß, C.**, Leichtle, T., Wurm, M., Aravena Pelizari, P., Standfuß, I., Zhu, X. X., So, E., Siedentop, S., Esch, T., and Taubenböck, H. (): Large-Area Characterization of Urban Morphology – Mapping Built-Up Height and Density with the TanDEM-X Mission and Sentinel-2. *IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing*, in press.
- [22] **Geiß, C.**, Aravena Pelizari, P., Blickensdörfer, L., and Taubenböck, H. (2019): Virtual Support Vector Machines with Self-Learning Strategy for Classification of Multispectral Remote Sensing Imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, 151, 42-58.
- [21] Taubenböck, H., Staab, J., Zhu, X., **Geiß, C.**, Dech, S., and Wurm, M. (2018) Are the poor digitally left behind? Analyzing urban divides using remote sensing and twitter data. *ISPRS International Journal of Geo-Information*, in press.
- [20] Selvakumaran, S., Plank, S., **Geiß, C.**, Rossi, C., and Middleton, C. (2018): Remote monitoring to predict bridge scour failure using Interferometric Synthetic Aperture Radar (InSAR) stacking techniques. *International Journal of Applied Earth Observation and Geoinformation*, 73, 463-470.
- [19] Taubenböck, H., Wurm, M., **Geiß, C.**, and Siedentop, S. (2018): Urbanization between compactness and dispersion - Designing a spatial model for measuring 2D binary settlement landscape configurations. *Journal of Digital Earth*, DOI: 10.1080/17538947.2018.1474957
- [18] **Geiß, C.**, Thoma, M., and Taubenböck, H. (2018): Cost-sensitive Multitask Active Learning for Characterization of Urban Environments with Remote Sensing. *IEEE Geoscience and Remote Sensing Letters*, 15(6), 922-926.

- [17] Aravena Pelizari, P., Spröhnle, K., **Geiß, C.**, Schöpfer, E., Plank, S., and Taubenböck, H. (2018): Multi-sensor feature fusion for very high spatial resolution built-up area extraction in temporary settlements. *Remote Sensing of Environment*, 209, 793-807.
- [16] **Geiß, C.**, Thoma, M., Pittore M., Wieland, M., Dech, S., and Taubenböck, H. (2017): Multitask Active Learning for Characterization of Built Environments with Multisensor Earth Observation Data. *IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing*, 10(12), 5583-5597.
- [15] **Geiß, C.**, Aravena Pelizari, P., Schrade, H., Brenning, A., and Taubenböck, H. (2017): On the Effect of Spatially Non-disjoint Training and Test Samples on Estimated Model Generalization Capabilities in Supervised Classification with Spatial Features. *IEEE Geoscience and Remote Sensing Letters*, 14(11), 2008-2012.
- [14] Leichtle, T., **Geiß, C.**, Lakes, T., and Taubenböck, H. (2017): Class imbalance in unsupervised change detection – A diagnostic analysis from urban remote sensing. *International Journal of Applied Earth Observation and Geoinformation*, 60, 83-98.
- [13] **Geiß, C.**, Schauß, A., Riedlinger, T., Dech, S., Zelaya, C., Guzman, N., Hube, M., Arsanjani, J. J., and Taubenböck, H. (2017): Joint use of remote sensing data and volunteered geographic information for exposure estimation – evidence from Valparaíso, Chile. *Natural Hazards*, 86, 81-105.
- [12] Leichtle, T., **Geiß, C.**, Wurm, M., Lakes, T., and Taubenböck, H. (2017): Unsupervised change detection in VHR remote sensing imagery – an object-based clustering approach in a dynamic urban environment. *International Journal of Applied Earth Observation and Geoinformation*, 54, 15-27.
- [11] **Geiß, C.**, Klotz, M., Schmitt, A., and Taubenböck, H. (2016): Object-based Morphological Profiles for Classification of Remote Sensing Imagery. *IEEE Transactions on Geoscience and Remote Sensing*, 54(10), 5952-5963.
- [10] Klotz, M., Kemper, T., **Geiß, C.**, Esch, T., and Taubenböck, H. (2016): How good is the map? A multi-scale cross-comparison framework for global settlement layers: Evidence from Central Europe. *Remote Sensing of Environment*, 178, 191-212.
- [9] Schreyer, J., **Geiß, C.**, and Lakes, T. (2016): TanDEM-X for Large-Area Modeling of Urban Vegetation Height: Evidence from Berlin, Germany. *IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing*, 9(5), 1876-1887.
- [8] **Geiß, C.**, Jilge, M., Lakes, T., and Taubenböck, H. (2016): Estimation of Seismic Vulnerability Levels of Urban Structures With Multisensor Remote Sensing. *IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing*, 9(5), 1913-1936.
- [7] **Geiß, C.**, and Taubenböck, H (2015) Object-based Postclassification Relearning. *IEEE Geoscience and Remote Sensing Letters*, 12(11), 2336-2340.
- [6] **Geiß, C.**, Wurm, M., Breunig, M., Felbier, A., and Taubenböck, H. (2015): Normalization of TanDEM-X DSM Data in Urban Environments with Morphological Filters. *IEEE Transactions on Geoscience and Remote Sensing*, 53(8), 4348-4362.

- [5] **Geiß, C.**, Aravena Pelizari, P., Marconcini, M., Sengara, W., Edwards, M., Lakes, T., and Taubenböck, H. (2015): Estimation of seismic buildings structural types using multi-sensor remote sensing and machine learning techniques. *ISPRS Journal of Photogrammetry and Remote Sensing*, 104, 175-188.
- [4] Gokon, H., Post, J., Stein, E., Martinis, S., Twele, A., Mück, M., **Geiß, C.**, Koshimura, S., and Matsuoka, M. (2015): A method for detecting devastated buildings by the 2011 Tohoku earthquake tsunami using multi-temporal TerraSAR-X data. *IEEE Geoscience and Remote Sensing Letters*, 12(6), 1277-1281.
- [3] **Geiß, C.**, Taubenböck, H., Tyagunov, S., Tisch, A., Post, J., and Lakes, T. (2014): Assessment of seismic building vulnerability from space. *Earthquake Spectra*, 30(4), 1553-1583.
- [2] **Geiß, C.**, and Taubenböck, H. (2013): Remote sensing contributing to assess earthquake risk: from a literature review towards a roadmap. *Natural Hazards*, 68, 7-48.
- [1] **Geiß, C.**, Taubenböck, H., Wurm, M., Esch, T., Nast, M., Schillings, C., and Blaschke, T. (2011): Remote sensing-based characterization of settlement structures for assessing local potential of district heat. *Remote Sensing*, 3, 1447–1471.

## EDUCATIONAL BACKGROUND

2014	<b>PhD (Dr. rer. nat.) Geoinformatics</b> Humboldt University, Berlin, Germany
2010	<b>MSc Applied Geoinformatics</b> Paris Lodron University, Salzburg, Austria
2007	<b>BA Geography</b> Friedrich-Alexander University, Erlangen-Nürnberg, Germany