

# Dr. Christian Katlein - Sea-Ice Physicist

Sea-Ice-Physics / Climate science

Alfred-Wegener-Institut

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## Education & Career:

- 2015 – ...      Postdoctoral researcher, sea-ice physics section at the Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany
- 2012 – 2015      PhD in Geosciences (sea-ice physics) at the Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Jacobs University Bremen, Germany:  
- PhD Thesis “Spatial variability of light regimes under Arctic sea ice”  
- supervisors: Marcel Nicolaus, Rüdiger Gerdes, and Vikram Unnithan  
- member of the graduate school POLMAR  
- research stay at the Cold Regions Research and Engineering Laboratory and Dartmouth College (Hanover, NH, USA) visiting Don Perovich (February-March 2015)
- 2006 – 2012      Diplom physicist, Eberhard-Karls University Tübingen, Germany:  
- Astronomy & Astrophysics, Geophysics  
- Diploma thesis „ROV based investigation of the spatial variability of light transmission through arctic sea ice in summer “ at the Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (Grade 1.0)
- 2009 – 2010      Studies abroad at the University Centre on Svalbard (UNIS), Longyearbyen, Spitsbergen:  
- Arctic Technology (sea-ice physics, permafrost engineering, geohazards)  
- Arctic Geology (seismics, georadar, GPS)
- 2005 – 2006      Civilian service in the administration of the natural park Upper Danube, Beuron, Germany
- 1996 – 2005      Abitur (Grade 1.3), secondary school, Albert-Schweitzer Gymnasium, Gundelfingen, Germany
- 1992 – 2005      Elementary School, Johann-Peter Hebel Schule, Gundelfingen, Germany

Languages: German: native speaker  
English: highly proficient in spoken and written English  
Norwegian: good command (Norwegian 1 – 4, University of Tübingen, Germany)  
Spanish: basic communication skills  
French: basic communication skills

Field experience: - six research cruises with RV Polarstern to the Central Arctic (TransArc 2011, IceArc 2012, Aurora 2014, TRANSSIZ 2015, KARASIK 2016, SIPCA 2017) operating remotely operated vehicles (ROV) underneath sea ice and deploying autonomous stations  
- various cryospheric field and freezer lab work during studies at UNIS, Longyearbyen (sea-ice, glaciers, permafrost, snow)  
- Trekking guide on Spitsbergen (summer: 2006, 2007, 2009, 2011, winter: 2008, 2009) for Spitsbergen Tours, ship lecturer and field guide for Oceanwide Expeditions and Tallship Company on Spitsbergen (summer 2011, 2014, 2015, 2016, 2017)

Leadership skills: - Group leader sea-ice physics, Expedition “Aurora ARK-28/3”, RV Polarstern 2014  
- Lecturer and field guide, SV Antigua, “Around Spitsbergen”, Tallship-Company 2014, 2015, 2016, 2017  
- Trekking and field guide, MV Plancius, “Basecamp Spitsbergen”, Oceanwide Expeditions 2011  
- Expedition leader, Spitzbergen expedition of the youth of the German Alpine Club (JDAV), climbing and mountaineering in central Svalbard, 2009  
- Leading board member as environmental consultant, youth of the German Alpine Club (JDAV), 2008-2012

Teaching skills: - Invited guest lecturer ( “sea ice geophysics” ) in the “introduction to geophysics” lecture of Prof. Vikram Unnithan, Jacobs University, Bremen (2015)  
- Supervisor master thesis: Jakob Belter, “Impact of water properties on the vertical variation of the under-ice light field”, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (2017)  
- Supervisor master thesis: Veronica Coppolaro, “3D sea-ice bottom topography mapped by multibeam sonar”, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (2017)  
- Supervisor internship Jakob Belter, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (2015)  
- Supervisor internship Clara Stolle, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (2013)  
- Instructor of the youth of the German Alpine Club (JDAV), education for youth group leaders, climbing, mountaineering, environmental education (2009-2015)  
- Youth group leader for the youth of the German Alpine Club (JDAV) in Bremen (2013-2015) and Freiburg (2003-2006)

Computer skills: Windows operating systems, Microsoft Office, ArcGIS, Adobe Illustrator, Programming languages: Matlab (advanced), PHP, HTML, Java, R, Python (basic knowledge), ...

Licenses: Car driving license (B)  
Boating license (Sportbootführerschein See)  
Climbing instructor (Trainer B, alpine climbing)

Youth group leader

Expert (“Sachkundiger”) for personal protective equipment against falls from heights

Scientific reviewer:

“Journal of Geophysical Research”, “The Cryosphere”, “Annals of Glaciology”, “Philosophical Transactions A of the Royal Society”, “Cold Regions Science and Technology”, “Marine Ecological Progress Series”, “remote sensing”

Professional memberships:

European Geosciences Union (EGU), German society for polar research (DGP), German physical society (DPG), Association of Polar Early Career Scientists (APECS), member of the board of APECS Germany national committee

Grants:

POLMAR outgoing stipend for research stay at CRREL, Hanover, NH, USA (2015)  
DAAD conference scholarship to attend the IGS Symposium in Hobart, Tasmania (2014)  
IASC grant to attend the GRC on polar marine Science in Ventura, CA, USA (2013)

Awards:

Best poster, Arctic frontiers conference 2015 (Tromsø):  
“Distribution of algal aggregates under summer sea ice in the Central Arctic”

Current research interests:

Optical properties of sea-ice, light transmittance, spatial variability  
Radiative transfer in sea-ice and the upper ocean  
Interdisciplinary observations of the sea-ice ecosystem using advanced robotic technologies (ROV & AUV) underneath pack ice in the Central Arctic

**Peer reviewed publications:**

Arndt, S., Meiners, K., Ricker, R., Krumpfen, T., **Katlein, C.**, Nicolaus, M. (2017) Influence of snow depth and surface flooding on light transmission through Antarctic pack ice, *Journal of Geophysical Research - Oceans* (in review)

**Katlein, C.**, Hendricks, S., and Key, J. (2017) Brief communication: Antarctic sea ice gain does not compensate for increased solar absorption from Arctic ice loss, *The Cryosphere Discussions*, doi:10.5194/tc-2016-279, in review

Lange, B. A., **Katlein, C.**, Nicolaus, M., Peeken, I., and Flores, H. (2016), Sea ice algae chlorophyll a concentrations derived from under-ice spectral radiation profiling platforms, *Journal of Geophysical Research - Oceans*, doi:10.1002/2016JC011991

Roca-Martí, M., Puigcorbó, V., Rutgers van der Loeff, M. M., **Katlein, C.**, Fernández-Méndez, M., Peeken, I., and Masqué, P. (2016), Carbon export fluxes and export efficiency in the central Arctic during the record sea-ice minimum in 2012: a joint  $^{234}\text{Th}/^{238}\text{U}$  and  $^{210}\text{Po}/^{210}\text{Pb}$  study, *Journal of Geophysical Research - Oceans*, doi:10.1002/2016JC011816.

**Katlein, C.**, Perovich, D.K., Nicolaus, M. (2016) Geometric effects of an inhomogeneous sea ice cover on the under ice light field, *Frontiers in Earth Science – Cryospheric Sciences* 4:6. doi:10.3389/feart.2016.00006

- Katlein, C.** , Arndt, S., Nicolaus, M., Jakuba, M.V., Elliott, S., Whitcomb, L.L., McFarland, C.J., Suman, S., Perovich, D.K., Gerdes, R., Boetius, A. and German, C.R. (2015) Influence of ice thickness and surface properties on light transmission through Arctic sea ice, *Journal of Geophysical Research - Oceans* doi:10.1002/2015JC010914
- Lee, Y. J., Matrai, P. A., Friedrichs, M. A. M., Saba, V. S., Antoine, D., Ardyna, M., Asanuma, I., Babin, M., Bélanger, S., Benoît-Gagné, M., Devred, E., Fernández-Méndez, M., Gentili, B., Hirawake, T., Kang, S.-H., Kameda, T., **Katlein, C.**, Lee, S. H., Lee, Z., Mélin, F., Scardi, M., Smyth, T. J., Tang, S., Turpie, K. R., Waters, K. J. and Westberry, T. K. (2015), An assessment of phytoplankton primary productivity in the Arctic Ocean from satellite ocean color/in situ chlorophyll-a-based models, *Journal of Geophysical Research - Oceans* doi:10.1002/2015JC011018
- Fernandez Mendez, M., **Katlein, C.** , Rabe, B., Nicolaus, M., Peeken, I., Bakker, K., Flores, H. and Boetius, A. (2015) Photosynthetic production in the Central Arctic during the record sea-ice minimum in 2012, *Biogeosciences* doi:10.5194/bgd-12-2897-2015
- Katlein, C.** , Fernandez Mendez, M. , Wenzhöfer, F. and Nicolaus, M. (2014) Distribution of algal aggregates under summer sea ice in the Central Arctic, *Polar Biology* doi:10.1007/s00300-014-1634-3
- Katlein, C.** , Nicolaus, M. and Petrich, C. (2014) The anisotropic scattering coefficient of sea ice, *Journal of Geophysical Research: Oceans* doi:10.1002/2013JC009502
- Assmy, P. , Ehn, K. , Fernandez Mendez, M. , Hop, H. , **Katlein, C.** , Sundfjord, S. , Bluhm, K. , Daase, M. , Engel, A. , Fransson, A. , Granskog, M. A. , Hudson, S. R. , Kristiansen, S. , Nicolaus, M. , Peeken, I. , Renner, A. H. H. , Spreen, G. , Tatarek, A. and Wiktor, J. (2013) Floating ice-algal aggregates below melting Arctic sea ice, *Plos One*, 8 (10), doi:10.1371/journal.pone.0076599
- Nicolaus, M. and **Katlein, C.** (2013) Mapping radiation transfer through sea ice using a remotely operated vehicle (ROV), *The Cryosphere*, 7 , pp. 763-777
- Boetius, A. , Albrecht, S. , Bakker, K. , Bienhold, C. , Felden, J. , Fernandez Mendez, M. , Hendricks, S. , **Katlein, C.** , Lalande, C. , Krumpfen, T. , Nicolaus, M. , Peeken, I. , Rabe, B. , Rogacheva, A. , Rybakova, E. , Somavilla Cabrillo, R. and Wenzhöfer, F. , RV Polarstern ARK27-3-Shipboard Science Party (2013) Export of Algal Biomass from the Melting Arctic Sea Ice., *Science*, 339 (6126), pp. 1430-1432 .doi:10.1126/science.1231346
- Nicolaus, M. , **Katlein, C.** , Maslanik, J. and Hendricks, S. (2012) Changes in Arctic sea ice result in increasing light transmittance and absorption, *Geophysical Research Letters* doi:10.1029/2012GL053738

### **Other publications:**

- Katlein, C.** (2015) Spatial variability of light regimes under Arctic sea ice, *PhD Thesis, Jacobs University Bremen* hdl:10013/epic.46401

**Katlein, C.** (2012) ROV basierte Untersuchung der räumlichen Variabilität der Lichttransmission durch arktisches Meereis im Sommer, *Diplomarbeit, Eberhard-Karls-Universität Tübingen*  
hdl:10013/epic.40496

**Cruise reports and conference presentations can be found under:**

<http://epic.awi.de/view/ldapid/ckatlein.html>

**Various datasets from the field campaigns are available under:**

<http://www.pangaea.de/search?q=email:Christian.Katlein@awi.de>