Robert Ricker

Curriculum Vitae

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Personal information

Nationality	German
Birth Date	October 31, 1984
Place of Birth	Lutherstadt Wittenberg, Germany
Research platforms	ORCID (0000-0001-6928-7757) | Google Scholar | Research Gate
h-index	20 (Google Scholar, Research Gate)

Research foci

- Satellite Remote Sensing of the Cryosphere
- Sea-Ice-Atmosphere-Ocean Interactions
- Snow on Sea Ice

Education

07/2011 – 10/2015 **PhD Candidate**, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven.
PhD in Geosciences from Jacobs University Bremen, "Sea-Ice Thickness derived from Cryosat-2: Validation and Uncertainties". Supervisor: Prof. Dr. Rüdiger Gerdes.

04/2008 – 05/2011 **Diploma in Geophysics**, Friedrich-Schiller University Jena, Germany.
"Mikrogravimetrische Messungen in Nordviktorialand, Antarktis". Supervisor: Prof. Dr. Gerhard Jentzsch.

09/2009 – 04/2010 **Study of Geodesy**, Università degli Studi di Trieste, Italy.

10/2005 – 03/2008 **Study of Physics, Vordiplom**, Philipps University Marburg, Germany.

Work experience

since 03/2021 **Senior Researcher**, Earth Observation, Norwegian Research Centre, Tromsø, Norway.

03/2017 – 02/2021 **Postdoctoral Researcher**, Sea Ice Physics, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany.

03/2016 – 02/2017 **Postdoctoral Fellowship**, Laboratoire d'Océanographie Physique et Spatiale, L'Institut français de recherche pour l'exploitation de la mer, Brest, France.

10/2015 – 02/2016 **Postdoctoral Researcher**, Sea Ice Physics, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany.

07/2011 – 10/2015 **Research Associate**, Sea Ice Physics, Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany.

Contributions to conferences

since 2011 **Participation in 22 international conferences (17 oral presentations)**.

Invited talks

06/2019 **Sea ice in the Earth System: a multidisciplinary perspective**, Brest, France, "Dynamic and thermodynamic sea ice growth in the Arctic from 2002-2017".

04/2019 **European Geosciences Union General AssemblyUnion Fall Meeting**, Vienna, Austria, "Merged operational satellite ice thickness retrievals to inform about the present state of Arctic sea ice".

12/2017 **American Geophysical Union Fall Meeting**, San Francisco, US, "Sea ice thickness derived from radar altimetry: achievements and future plans".

09/2016 **ESA Advanced Training Course on Remote Sensing of the Cryosphere**, Leeds, UK, "Remote Sensing of Snow on Sea Ice", invited as lecturer.

01/2016 **L'Institut français de recherche pour l'exploitation de la mer**, Brest, France, "Sea Ice Thickness obtained from Space".

12/2015 **American Geophysical Union Fall Meeting**, San Francisco, US, "The impact of the snow cover on sea-ice thickness products, retrieved by Ku band radar altimeters".

Field campaigns

2020 **MOSAiC drift experiment**, *PS-122.3*, Research Vessel Polarstern.
Responsibilities: helicopter surveys (laser scanner, electromagnetic-induction sounding), sea-ice thickness measurements with ground-based electromagnetic-induction sounding devices, satellite remote sensing data acquisition.

2019 **Airborne surveys over Arctic sea ice**, *ICEBIRD 2019*, Research Aircraft Polar-6.
Responsibilities: snow radar and laser scanner measurements over sea ice.

2017 **Airborne surveys over Arctic sea ice**, *PAMARCMIP 2017*, Research Aircraft Polar-5.
Responsibilities: snow radar and laser scanner measurements over sea ice.

2015 **Expedition to the Arctic Ocean**, *PS-94*, Research Vessel Polarstern.
Responsibilities: sea-ice thickness measurements with airborne and ground-based electromagnetic-induction sounding devices, snow depth measurements.

2013 **Airborne surveys over Antarctic sea ice**, *AMASIM*, Research Aircraft Polar-6.
Responsibilities: radar altimetry measurements over Antarctic sea ice for CryoSat-2 validation.

Expedition to the Weddell Sea, Antarctic, *PS-81*, Research Vessel Polarstern.
Responsibilities: sea-ice thickness measurements with airborne and ground-based electromagnetic-induction sounding devices.

2012 **Airborne surveys over sea ice north of Svalbard**, *CryoVEx 2012*.
Responsibilities: radar altimetry measurements over Arctic sea ice for CryoSat-2 validation.

2011 **Expedition to the Arctic Ocean**, *PS-78*, Research Vessel Polarstern.
Responsibilities: sea-ice thickness measurements with airborne and ground-based electromagnetic-induction sounding devices.

Research experience

since 2014 **8 peer-reviewed publications as first-author** and **30 peer-reviewed publications as co-author**

2019-2020 Participation in the MOSAiC drift experiment, editor of "Multi-Sensor Sea Ice Maps" to track sea ice conditions in the vicinity of the MOSAiC ice camp (https://www.meereisportal.de)

since 2017 Principal or Co-Principal Investigator of 4 research projects (see next section "Research grants")

since 2011 Work in international research consortia in the framework of several research projects:

- ESA SMOS+ Sea-Ice
- ESA Climate Change Initiative
- ESA Cryosat Sea Ice Product Validation
- Horizon 2020 Space-borne observations for detecting and forecasting sea ice cover extremes
- Copernicus Climate Change Service

Research grants

2020 – 2022 **Sea ice melt and ocean interactions in the Fram Strait (Fram-Ice)**, *AWI-Ifremer*, Principal Investigator.
Grant amount: 38,000 Euro

2018 – 2022 **SMOS & CryoSat-2 Sea Ice Data Product Processing and Dissemination Service**, *ESA*, Principal Investigator.
Grant amount: 500,000 Euro

2018 – 2019 **Copernicus Sea Ice Thematic Assembly Centre**, *EU*, Co-Principal Investigator.
Grant amount: 30,000 Euro

2017 – 2019 **CryoSat Science-oriented Data Analysis over Sea-Ice Areas**, *ESA*, Co-Principal Investigator.
Grant amount: 47,000 Euro

since 2012 **Conference Travel Grants**.

- POLMAR Graduate School travel grant
- ESSRES Graduate School travel grant
- Climate and Cryosphere (CliC) travel grant

Teaching experiences

09/2016 **Lecturer**, ESA Advanced Training Course on Remote Sensing of the Cryosphere, Leeds, UK.

2010 **Teaching Assistant**, Friedrich-Schiller University Jena, Germany.

Supervision

since 2018 Supervision of a PhD project

since 2018 Co-Supervision of 2 PhD projects

2017 – 2018 Co-Supervision of a Master project

Institutional responsibilities

2013 – 2014 PhD Student Representative at AWI

Activity as reviewer

since 2019 Proposal reviews:
- Marsden Fund

since 2015 Journal reviews:
- The Cryosphere
- Remote Sensing of Environment
- Geophysical Research Letters
- Remote Sensing
- Annals of Glaciology
- Advances in Space Research
- Elementa: Science of the Anthropocene
- Antarctic Science

Membership of scientific societies

- European Geosciences Union (EGU)
- American Geophysical Union (AGU)
- Deutsche Geophysikalische Gesellschaft (DGG)

Outreach

- Articles/contributions on "Meereisportal News": https://www.meereisportal.de
- Articles/contributions on "Helmholtz Polarstern Blog"
- Articles/contributions on "AWI News": https://www.awi.de/ueber-uns/service/presse.html
- Interviews on the state of Arctic sea ice for newspapers: "Nordseezeitung", "Weser-Kurier", and "Süddeutsche Zeitung"

Programming/computer skills

Scientific	Python, R, MATLAB, IDL, GMT, Unix
Typography	Microsoft Office, LaTeX
OS	Mac OS, Linux, Windows

Languages

German	Native
English	Fluent
Italian	Intermediate
French	Basic knowledge

Peer-reviewed publications

2021 Belter, H. J., Krumpen, T., von Albedyll, L., Alekseeva, T. A., Birnbaum, G., Frolov, S. V., Hendricks, S., Herber, A., Polyakov, I., Raphael, I., **Ricker, R.**, Serovetnikov, S. S., Webster, M., and Haas, C. (2021). Interannual variability in Transpolar Drift summer sea ice thickness and potential impact of Atlantification, The Cryosphere, 15, 2575–2591.

Ricker, R., Kauker, F., Schweiger, A., Hendricks, S., Zhang, J., & Paul, S. (2021). Evidence for an Increasing Role of Ocean Heat in Arctic Winter Sea Ice Growth, Journal of Climate, 34(13), 5215-5227.

Jutila, A., King, J., Paden, J., **Ricker, R.**, Hendricks, S., Polashenski, C., ... & Haas, C. (2021). High-Resolution Snow Depth on Arctic Sea Ice From Low-Altitude Airborne Microwave Radar Data. IEEE Transactions on Geoscience and Remote Sensing.

Abdalla, S., Kolahchi, A. A., Ablain, M., Adusumilli, S., Bhowmick, S. A., Alou-Font, E., ... & **Ricker, R.**, ... & Hamon, M. (2021). Altimetry for the future: Building on 25 years of progress. Advances in Space Research.

Wang, Q., **Ricker, R.**, & Mu, L. (2021). Arctic sea ice decline preconditions events of anomalously low sea ice volume export through Fram Strait in the early 21st century. Journal of Geophysical Research: Oceans, 126(2).

Min, C., Yang, Q., Mu, L., Kauker, F., & **Ricker, R.** (2021). Ensemble-based estimation of sea-ice volume variations in the Baffin Bay. The Cryosphere, 15(1), 169-181.

2020 Stroeve, J., Nandan, V., Willatt, R., Tonboe, R., Hendricks, S., **Ricker, R.** , ... & Tsamados, M. (2020). Surface-based Ku-and Ka-band polarimetric radar for sea ice studies. The Cryosphere, 14(12), 4405-4426.

Castellani, G., Schaafsma, F. L., Arndt, S., Lange, B. A., Peeken, I., Ehrlich, J., ... **Ricker, R.**, ... & Schwegmann, S. (2020). Large-Scale Variability of Physical and Biological Sea-Ice Properties in Polar Oceans. *Frontiers in Marine Science*, 7, 536.

Krumpen, T., Birrien, F., Kauker, F., Rackow, T., von Albedyll, L., Angelopoulos, M., Belter, H. J., Bessonov, V., Damm, E., Dethloff, K., Haapala, J., Haas, C., Hendricks, S., Hoelemann, J., Hoppmann, M., Kaleschke, L., Karcher, M., Kolabutin, N., Lenz, J., Morgenstern, A., Nicolaus, M., Nixdorf, U., Petrovsky, T., Rabe, B., Rabenstein, L., Rex, M., **Ricker, R.**, Rohde, J., Shimanchuk, E., Singha, S., Smolyanitsky, V., Sokolov, V., Stanton, T., Timofeeva, A., and Tsamados, M. (2020). The MOSAiC ice floe: sediment-laden survivor from the Siberian shelf, *The Cryosphere*, 14, 2173-2187.

Belter, H. J., Krumpen, T., Hendricks, S., Hoelemann, J. A., Janout, M. A., **Ricker, R.**, and Haas, C. (2020). Satellite-based sea ice thickness changes in the Laptev Sea from 2002 to 2017: Comparison to mooring observations, *The Cryosphere*, 14, 2189-2203.

Meloni, M., Bouffard, J., Parrinello, T., Dawson, G., Garnier, F., Helm, V., Di Bella, A., Hendricks, S., **Ricker, R.**, Webb, E., Wright, B., Nielsen, K., Lee, S., Passaro, M., Scagliola, M., Simonsen, S. B., Sandberg Sørensen, L., Brockley, D., Baker, S., Fleury, S., Bamber, J., Maestri, L., Skourup, H., Forsberg, R., and Mizzi, L. (2020). CryoSat Ice Baseline-D validation and evolutions, *The Cryosphere*, 14, 1889–1907.

Mäkynen, M., Haapala, J., Aulicino, G., Balan-Sarojini, B., Balmaseda, M., Gegiuc, A., Girard-Ardhuin, F., Hendricks, S., Heygster, G., Istomina, L., Kaleschke, L., Karvonen, J., Krumpen, T., Lensu, M., Mayer, M., Parmiggiani, F., **Ricker, R.**, Rinne, E., Schmitt, A., Similä, M., Tietsche, S., Tonboe, R., Wadhams, P., Winstrup, M., Zuo, H. (2020). Satellite Observations for Detecting and Forecasting Sea-Ice Conditions: A Summary of Advances Made in the SPICES Project by the EU's Horizon 2020 Programme. *Remote Sensing*, 12(7), 1214.

Selyuzhenok, V., Bashmachnikov, I., **Ricker, R.**, Vesman, A., and Bobylev, L. (2020). Sea ice volume variability and water temperature in the Greenland Sea, *The Cryosphere*, 14, 477–495.

2019 Min, C., Mu, L., Yang, Q., **Ricker, R.**, Shi, Q., Han, B., Wu, R., and Liu, J. (2019). Sea ice export through the Fram Strait derived from a combined model and satellite data set, *The Cryosphere*, 13, 3209–3224.

Von Schuckmann, K., Le Traon, P. Y., Smith, N., Pascual, A., Djavidnia, S., ... & **Ricker, R.** (2019). Copernicus Marine Service Ocean State Report, Issue 3. *Journal of Operational Oceanography*, 12(sup1), S1-S123.

Krumpen, T., Belter, H. J., Boetius, A., Damm, E., Haas, C., Hendricks, S., ... & **Ricker, R.** (2019). Arctic warming interrupts the Transpolar Drift and affects long-range transport of sea ice and ice-rafted matter. *Scientific reports*, 9(1), 5459.

Quartly, G. D., Rinne, E., Passaro, M., Andersen, O. B., Dinardo, S., Fleury, S., ... & **Ricker, R.** (2019). Retrieving sea level and freeboard in the Arctic: a review of current radar altimetry methodologies and future perspectives. *Remote Sensing*, 11(7), 881.

2018 Mu, L., Losch, M., Yang, Q., **Ricker, R.**, Losa, S. N., Nerger, L. (2018). Arctic-wide sea ice thickness estimates from combining satellite remote sensing data and a dynamic ice-ocean model with data assimilation during the CryoSat-2 period. *Journal of Geophysical Research: Oceans*.

Yi, D., Kurtz, N., Harbeck, J., Kwok, R., Hendricks, S., **Ricker, R.** (2018). Comparing Coincident Elevation and Freeboard From IceBridge and Five Different CryoSat-2 Retrackers. *IEEE Transactions on Geoscience and Remote Sensing*.

Ricker, R., Girard-Ardhuin, F., Krumpen, T., Lique, C. (2018). Satellite-derived sea ice export and its impact on Arctic ice mass balance, *The Cryosphere*, 12, 3017-3032.

Paul, S., Hendricks, S., **Ricker, R.**, Kern, S., Rinne, E. (2018). Empirical parametrization of Envisat freeboard retrieval of Arctic and Antarctic sea ice based on CryoSat-2: progress in the ESA Climate Change Initiative, *The Cryosphere*, 12, 2437-2460.

Kaminski, T., Kauker, F., Toudal Pedersen, L., Voßbeck, M., Haak, H., Niederdrenk, L., Hendricks, S., **Ricker, R.**, Karcher, M., Eicken, H., Gråbak, O (2018). Arctic Mission Benefit Analysis: impact of sea ice thickness, freeboard, and snow depth products on sea ice forecast performance, *The Cryosphere*, 12, 2569-2594.

Mu, L. , Yang, Q. , Losch, M. , Losa, S. N., **Ricker, R.** , Nerger, L., Liang, X. (2018). Improving sea ice thickness estimates by assimilating CryoSat-2 and SMOS sea ice thickness data simultaneously. *Q.J.R. Meteorol. Soc.*, 144(711), 529-538.

2017 Meyer, B., Freier, U., Grimm, V., Groeneveld, J., Hunt, B. P. V., Kerwath, S., King, R., Klaas, C., Pakhomov, E., Meiners, K. M., Melbourne- Thomas, J., Murphy, E. J., Thorpe, S. E., Stammerjohn, S., Wolf-Gladrow, D., Auerswald, L., Götz, A., Halbach, L., Jarman, S., Kawaguchi, S., Krumpen, T., Nehrke, G., **Ricker, R.**, Sumner, M., Teschke, M., Trebilco, R., and Yilmaz, N. I. (2017). The winter pack-ice zone provides a sheltered but food-poor habitat for larval Antarctic krill, *Nature Ecology & Evolution*.

Skourup, H., Farrell, S. L., Hendricks, S., **Ricker, R.**, Armitage, T. W. K., Ridout, A., Haas, C., Andersen, O. B., Baker, S. (2017). An assessment of state-of-the-art mean sea surface and geoid models of the Arctic Ocean: Implications for sea ice freeboard retrieval. *Journal of Geophysical Research: Oceans*, 122.

Nandan, V., Geldsetzer, T., Yackel, J., Mahmud, M., Scharien, R., Howell, S., King, J., **Ricker, R.**, Else, B. (2017). Effect of snow salinity on CryoSat-2 Arctic first-year sea ice freeboard measurements. *Geophysical Research Letters*, 44, 10419-10426.

Meiners, K. M., Arndt, S., Bestley, S., Krumpen, T., **Ricker, R.**, Milnes, M., Newbery, K., Freier, U., Jarman, S., King, R., Proud, R., Kawaguchi, S., Meyer, B. (2017). Antarctic pack ice algal distribution: Floe-scale spatial variability and predictability from physical parameters. *Geophysical Research Letters*, 44, 7382-7390.

Ricker, R., Hendricks, S., Kaleschke, L., Tian-Kunze, X., King, J., Haas, C. (2017). A weekly Arctic sea-ice thickness data record from merged CryoSat-2 and SMOS satellite data. *The Cryosphere*, 11, 1607-1623

Castro-Morales, K., **Ricker, R.**, Gerdes, R. (2017). Regional distribution and variability of model-simulated Arctic snow on sea ice. *Polar Science*, 13, 33-49.

Ricker, R., Hendricks, S., Girard-Ardhuin, F., Kaleschke, L., Lique, C., Tian-Kunze, X., Nicolaus, M., Krumpen, T. (2017). Satellite-observed drop of Arctic sea ice growth in winter 2015-2016. *Geophysical Research Letters*, 44(7), 3236-3245.

Arndt, S., Meiners, K. M., **Ricker, R.**, Krumpen, 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*, 122(3), 2108-2119.

2016 Grosfeld, K., Treffeisen, R., Asseng, J., Bartsch, A., Bräuer, B., Fritzsch, B., Gerdes, R., Hendricks, S., Hiller, W. ,Heygster, G., Krumpen, T., Lemke, P., Melsheimer, C., Nicolaus, M., **Ricker, R.**, and Weigelt, M. (2016): Online sea-ice knowledge and data platform www.meereisportal.de, *Polarforschung*, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research & German Society of Polar Research, 85 (2), pp. 143-155.

Schwegmann, S., Rinne, E., **Ricker, R.**, Hendricks, S., Helm, V. (2016). About the consistency between Envisat and CryoSat-2 radar freeboard retrieval over Antarctic sea ice. *The Cryosphere*, 10, 1415-1425.

Ricker, R., Hendricks, S., Beckers, J. F. (2016). The Impact of Geophysical Corrections on Sea-Ice Freeboard Retrieved from Satellite Altimetry. *Remote Sensing*, 8(4), 317.

2015 **Ricker, R.**, Hendricks, S., Perovich, D. K., Helm, V., Gerdes, R. (2015). Impact of snow accumulation on CryoSat-2 range retrievals over Arctic sea ice: An observational approach with buoy data. *Geophysical Research Letters*, 42(11), 4447-4455.

Ricker, R., Hendricks, S., Helm, V., Gerdes, R. (2015). Classification of CryoSat-2 radar echoes. In Towards an Interdisciplinary Approach in Earth System Science (pp. 149-158). *Springer International Publishing*.

Price, D., Beckers, J., **Ricker, R.**, Kurtz, N., Rack, W., Haas, C., Helm, V., Hendricks, S., Leonard, G., Langhorne, P. J. (2015). Evaluation of CryoSat-2 derived sea-ice freeboard over fast ice in McMurdo Sound, Antarctica. *Journal of Glaciology*, 61(226), 285-300.

2014 **Ricker, R.**, Hendricks, S., Helm, V., Skourup, H., Davidson, M. (2014). Sensitivity of CryoSat-2 Arctic sea-ice freeboard and thickness on radar-waveform interpretation. *The Cryosphere*, 8(4), 1607-1622.