Lars Axell, 660927-0415

Curriculum vitae

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Education

1995	M.Sc.	Earth Sciences Centre, Göteborg University, Sweden (math, physics, astronomy, oceanography).
2001	Ph.D.	Earth Sciences Centre, Göteborg University, Sweden (physical oceanography). Thesis title: “Turbulent mixing in the ocean with application to Baltic Sea modeling”. Thesis advisors: Anders Stigebrandt (main) and Anders Omstedt.

Experience

1995-05–2001-04	Earth Sciences Centre, Göteborg University, Sweden (Graduate student, 100%)
1998-08–1999-10	Swedish Meteorological and Hydrological Institute (SMHI), Research and Development Department, Oceanographic Unit (time-limited position, 100%)
2000-08–now	Swedish Meteorological and Hydrological Institute (SMHI), Research and Development Department, Oceanographic Unit (indefinite, 100%)
2001-08–2001-12	Paternal leave (100%)

Projects

1997–2000	Diapycnal Mixing Experiment (DIAMIX)
1998–1999	Baltic Sea System Study subproject 6 (BASYS–SP6, EU)
2002–2006	Baltic Sea Ice Climate (Swedish Maritime Administration)
2003–2005	Ice Ridging Information for Decision Making in Shipping Operations (IRIS, EU)
2004–2006	Seasonal Forecasts (SMHI)
2005–2012	PolarView (ESA)
2005–2010	Developing Arctic Modelling and Observing Capabilities for Long-Term Environmental Studies (DAMOCLES, EU)
2010–2011	Variational Data Assimilation of Sea Ice (VARICE, Swedish Maritime Administration)
2010-2012	MyOcean (EU)
2012-2015	MyOcean-2 + MyOcean FollowOn(EU)

2014–2016 PolarIce (EU)
2014-now SNSB: Assimilation of SLA
2015–now Copernicus

Main Tasks at SMHI

Currently Research Leader in Operational Oceanography and ocean modelling, within the Oceanographic Research Unit at SMHI. Development work within operational oceanography, especially variational data assimilation (3D/4D EnVar), reanalysis work, and the three-dimensional oceanographic model NEMO-Nordic (based on Nucleus for European Modelling of the Ocean, version 3.6).

List of Publications

Omstedt, A., and Axell, L. B., Modeling the seasonal, interannual and long-term variations of salinity and temperature in the Baltic proper. Tellus, 50A, 637-652, 1998.

Axell, L. B., On the variability of Baltic Sea deepwater mixing, J. Geophys. Res., 103 (C10), 21,667- 21,682, 1998.

Axell, L. B., and Liungman, O., A one-equation turbulence model for geophysical applications: Comparison with data and the k-ε model, Env. Fluid Mech., 1, 71-106, 2001.

Axell, L. B., Wind-driven internal waves and Langmuir circulations in a numerical ocean model of the southern Baltic Sea, J. Geophys. Res., 107 (C11), 3204, doi: 10.1029/2001JC000922, 2002.

Omstedt, A., and L. B., Axell, Modeling the variations of salinity and temperature in the large Gulfs of the Baltic Sea. Cont. Shelf Res., 23, 265-294, 2003.

Kotovirta, V., Jalonen, R, Axell, L., Riska, K. and Berglund, R. A system for route optimization in ice-covered waters, Cold Regions Science and Technology, doi:10.1016/j.coldregions.2008.07.003, 2008.

Liu, Y., Meier, M. And Axell, L.B., Reanalyzing temperature and salinity on decadal time scales using the Ensemble Optimal Interpolation data assimilation method and a 3D ocean circulation model of the Baltic Sea, J. Geophys. Res.: Oceans 118, 5536-5554, doi: 10.1002/jgrc.20384, October, 2013.

Löptien, U. And Axell, L.B., Ice and AIS: Ship speed data and sea ice forecasts in the Baltic Sea, The Cryosphere 8 (6), November, 2014.

Hordoir, R., Axell, L.B., Löptien, U., Dietze, H. And Kuznetsov, I., Influence of sea level rise on the dynamics of salt inflows in the Baltic Sea, J. Geophys. Res.: Oceans 120 (10), September, 2015.

Golbeck, I., et al., Uncertainty estimation for operational ocean forecast products—a multi-model ensemble for the North Sea and the Baltic Sea, Ocean Dynamics 65 (12), October, 2015.

Axell, L.B. and Liu, Y., Application of 3-D ensemble variational data assimilation to a Baltic Sea reanalysis 1989–2013, Tellus 68, doi: 10.3402/tellusa.v68.24220, 2016.

von Schuckmann, K, Le Traon, P.-Y., Alvarez Fanjul, E., Axell, L.B., et al., The Copernicus Marine Environment Monitoring Service Ocean State Report (CMEMS OSR), Proceedings of the Institute of Marine Engineering, Science, and Technology. Journal of operational oceanography 9(Sup2):235-320, January 2017.

Pemberton, P., Löptien, U., Hordoir, H., Höglund, A., Schimanke, S., Axell, L.B., and Haapaala, J., Sea-ice evaluation of NEMO-Nordic 1.0: a NEMO–LIM3.6 based ocean–sea ice model setup for the North Sea and Baltic Sea, Geosci. Model Dev., 10, 3105–3123, https://doi.org/10.5194/gmd-10-3105-2017, 2017.

Arneborg, L., Höglund, A., Axell, L., Lensu, M. and Liungman, O., Oild drift modeling in pack ice – Sensitivity to oil-in-ice parameters, Ocean Engineering 144, 340-350, 2017.

Mulet, S., B. Buongiorno Nardelli, S. A. Good, A. Pisano, E. Greiner, M. Monier, E. Autret, L. B. Axell, et al., Ocean temperature and salinity In: Copernicus Marine Service Ocean State Report, Issue 2, Journal of Operational Oceanography, 11:sup1, s13–s16, DOI: 10.1080/1755876X.2018.1489208, 2018.

Hordoir, R., L. Axell, et al., Nemo-Nordic 1.0: A NEMO-based ocean model for the Baltic and North seas – research and operational applications, Geosci. Model Dev., 12, 363–386, 2019.

Amir-Heidari, P., L. Arneborg, J. F. Lindgren, A. Lindhe, L. Rosén, M. Raie, L. B. Axell, I.-M. Hassellöv, A state-of-the-art model for spatial and stochastic oil spill risk assessment: A case study of oil spill from a shipwreck, Environment International 126:309-320, DOI: 10.1016/j.envint.2019.02.037, 2019.

Nilsson, E., A. Rutgersson, A. Dingwell, J.-V. Björkqvist, H. Pettersson, L. B. Axell, J. Nyberg, E. Strömstedt, Characterization of Wave Energy Potential for the Baltic Sea with Focus on the Swedish Exclusive Economic Zone, Energies 12(5):793, DOI: 10.3390/en12050793, 2019.

Technical reports

Axell, L.B., BSRA-15: A Baltic Sea Reanalysis 1990–2004, Reports Oceanography 45, Swedish Meteorological and Hydrologiocal Institute, January, 2013.

Dieterich, C., et al, Evaluation of the SMHI coupled atmosphere-ice-ocean model RCA4-NEMO, Reports Oceanography 47, Swedish Meteorological and Hydrologiocal Institute, February, 2013.

Kuznetsov, I., Dieterich, C, Hordoir, R., Axell, L.B., Höglund, A., Eilola, K., and Schimanke, S., Model study on the variability of ecosystem parameters in the Skagerrak-Kattegat area, effect of load reduction in the North Sea and possible effect of BSAP on Skagerrak-Kattegat area, Oceanografi nr. 119, Swedish Meteorological and Hydrologiocal Institute, 2016.

Simoncelli, S., Masina, S., Axell, L.B., et al., MyOcean regional reanalyses: overview of reanalyses systems and main results, #54 Main outcomes of the MyOcean2 and MyOcean Follow-On projects, Mercator Ocean Journal, No. 54, February 2016.

Le Trayon, A. Ali, E. Alvarez Fanjul, L. Aouf, L. Axell et al., The COPERNICUS Marine Environmental Monitoring Service: Main scientific achievements and future prospects, Mercator Ocean Journal, No. 56, September 2017.

Conference papers

Axell, L., Extended Ice Forecast Modelling for the Baltic Sea, European Operational Oceanography: Present and Future, Proceedings of the Fourth International Conference on EuroGoos, 2006.

Uiboupin, R., Axell, L.B., Raudsepp, U. and Sipelgas, L., Comparison of operational ice charts with satellite based ice concentration products in the Baltic Sea, DOI: 10.1109/BALTIC.2010.5621649, Conference: Baltic International Symposium (BALTIC), 2010 IEEE/OES US/EU, September, 2010.

Berg, A., Axell, L. and Eriksson, L.E.B., Comparison between SAR derived sea ice displacement and hiindcasts by the operational ocean model HIROMB, IGARSS 2013, Melbourne, Australia, 2013.

Axell, L. and Liu, Y., Ensemble-based data assimilation of observations into NEMO-Nordic, 8th EuroGOOS Conference, Bergen, 3-5 October, 2017.