Rei Chemke

Department of Earth and Planetary Sciences
Weizmann Institute of Science
Rehovot 76100, Israel

Tel: +972-8-934-3397
email: rei.chemke@weizmann.ac.il
https://www.weizmann.ac.il/EPS/Chemke/

Education

2014-2017 PhD Atmospheric Dynamics, Weizmann Institute of Science, Advisor: Yohai Kaspi
2012-2014 MSc Atmospheric Dynamics, Weizmann Institute of Science, Advisor: Yohai Kaspi
2009-2012 BSc Atmosphere, Ocean and Climate Sciences, Hebrew University

Professional Positions

2020-present Assistant Professor, Weizmann Institute of Science
2019-2020 Postdoctoral research scientist, Columbia University
2017-2019 Postdoctoral fellow, Columbia University

Supervision of graduate students

Current

2023-present Itamar Karbi (PhD), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science
2023-present Noga Liberty (PhD), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science
2023-present Or Hess (PhD), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science

Graduated

2021-2022 Itamar Karbi (MSc), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science
2022-2023 Noga Liberty (MSc), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science
2022-2023 Or Hess (MSc), Dept. of Earth & Planetary Sciences, Weizmann Institute of Science

Publications (members of my group are in bold)

44. **Hess, O.** and **Chemke, R.**, 2025. Forced Changes in the North Atlantic Storm Track Over the Last Millennium, in review.
43. **Karbi, I.** and **Chemke, R.**, 2025. Emergence of Winter Large-scale Transient Atmospheric Waves in the Northern Hemisphere, in review.
42. **Liberty, N.** and **Chemke, R.**, 2025. The role of ocean processes in future Northern Hemisphere mid-latitude winter precipitation changes, in review.
41. **Chemke, R.**, 2025. Historical and future mid-latitude storm changes in climate models, review chapter in: Encyclopedia of Climate System Science, Chap. 7.2.10, accepted.
40. **Chemke, R.**, 2025. Persistent austral winter storm track weakening beyond doubling of CO2 concentrations, Nature Communications, 16, 1935. url.
39. **Chemke, R.** and Yuval, J., 2025. Atmospheric circulation to constrain subtropical precipitation projections, Nature Climate Change. url.
38. **Chemke, R.**, 2024. Centennial-scale recovery of the North Atlantic summer storm track weakening, Geophys. Res. Lett., 51, e2024GL109801. url
37. Mitevski, I., **Chemke, R.**, Orbe, C. and Polvani, L. M., 2024. Southern Hemisphere winter storm tracks respond differently to low and high CO2 forcings, J. Clim., 37, 5355-5372. url
36. **Hess, O.** and **Chemke, R.**, 2024. Anthropogenic forcings reverse a simulated multi-century naturally-forced Hadley cell intensification, Nature Communications, 15, 4001. url
35. **Chemke, R.** and Coumou, D., 2024. Human influence on the recent weakening of strom-tracks in boreal summer, npj Climate Atmos. Sci., 7, 86. url
34. Raiter D., Galanti, E., **Chemke, R.** and Kaspi, Y., 2024. Linking Future Tropical Precipitation Changes to Zonally-Asymmetric Large-Scale Meridional Circulation, Geophys. Res. Lett., 51, 6, e2023GL106. url
33. **Karbi, I.** and **Chemke, R.**, 2023. A shift towards broader and less persistent Southern Hemisphere temperature anomalies, npj Climate Atmos. Sci., 6, 200. url
32. **Chemke, R.** and Yuval, J., 2023. Human-induced weakening of the Northern Hemisphere tropical circulation, Nature, 617, 529-532. url
31. **Chemke, R.**, Ming Y. and Yuval, J., 2022. The intensification of winter mid-latitude storm tracks in the Southern Hemisphere, Nature Climate Change, 12, 553-557. url

30. **Chemke, R.**, 2022. The future poleward shift of Southern Hemisphere summer mid-latitude storm tracks stems from ocean coupling , Nature Communications, 13, 1730. url
29. **Chemke, R.**, Zanna, L., Polvani, L. M., Orbe, C. and Sentman, L., 2022. The Future Intensification of the North Atlantic Winter Storm Track: The Key Role of Dynamic Ocean Coupling, J. Clim., 35, 8, p. 2407-2421. url
28. **Chemke, R.**, 2022. Large hemispheric differences in the Hadley cell variability due to ocean coupling, npj Climate Atmos. Sci., 5, 1. url
27. Polvani, L. M., Banerjee, A., **Chemke, R.**, Doddridge, E. W., Ferreira, D., Gnanadesikan, A., Holland, M. A., Kostov, Y., Marshall, J., Seviour, W. J. M., Solomon, S. and Waugh, D. W., 2021. Interannual SAM Modulation of Antarctic Sea Ice Extent Does Not Account for Its Long-Term Trends, Pointing to a Limited Role for Ozone Depletion, Geophys. Res. Lett., 48, e2021GL094871. url
26. **Chemke, R.**, Polvani, L. M., Kay, J. E. and Orbe, C., 2021. Quantifying the role of ocean coupling in Arctic amplification and sea-ice loss over the 21st century, npj Climate Atmos. Sci., 4, 46. url
25. Mitevski, I., Orbe, C., **Chemke, R.**, Nazarenko, L. and Polvani, L. M., 2021. Non-monotonic response of the climate system to abrupt CO2 forcing, Geophys. Res. Lett., 48, 6, e2020GL090. url
24. **Chemke, R.** and Polvani, L. M., 2021. Elucidating the mechanisms responsible for Hadley cell weakening under 4xCO2 forcing, Geophys. Res. Lett., 48, 3, 2020GL0903. url
23. **Chemke, R.**, 2021. Future Changes in the Hadley Circulation: The Role of Ocean Heat Transport, Geophys. Res. Lett., 48, 4, e2020GL091. url
22. **Chemke, R.** and Ming, Y., 2020. Large atmospheric waves will get stronger while small waves will get weaker, Geophys. Res. Lett., 47, 22, e2020GL090. url
21. **Chemke, R.**, Previdi, M., England, M. R. and Polvani, L. M., 2020. Distinguishing the impacts of ozone and ozone depleting substances on the recent increase in Antarctic surface mass balance, The Cryosphere, 14, 11, p. 4135-4144. url
20. **Chemke, R.** and Polvani, L. M., 2020. Using multiple large ensembles to elucidate the discrepancy between the 1979–2019 modeled and observed Antarctic sea ice trends, Geophys. Res. Lett., 47, e2020GL0-88339. url
19. **Chemke, R.**, Zanna L. and Polvani, L. M., 2020. Identifying a human signal in the North Atlantic warming hole, Nature Communication, 11, 1540. url
18. **Chemke, R.** and Polvani, L. M., 2020. Linking midlatitudes eddy heat flux trends and polar amplification, npj Climate Atmos. Sci., 3, 8. url
17. **Chemke, R.** and Polvani, L. M., 2019. Opposite tropical circulation trends in climate models and in reanalyses, Nature Geoscience, 12, 528-532. url
16. **Chemke, R.** and Polvani, L. M., 2019. Exploiting the abrupt 4xCO2 scenario to elucidate tropical expansion mechanisms, J. Clim., 32, 859-875. url
15. Galperin, B., Sukoriansky, S., Young, R. M. B., **Chemke R.**, Kaspi, Y., Read, P. L. and Dikovskaya, N., 2019. Barotropic and zonostrophic turbulence, review chapter in: zonal jets, Cambridge University Press, Chap. 13. url
14. **Chemke, R.**, Polvani, L. M. and Deser, C., 2019. The effect of Arctic sea-ice loss on the Hadley circulation, Geophys. Res. Lett., 46, 963–972. url
13. **Chemke, R.** and Polvani, L. M., 2018. Ocean circulation reduces the Hadley cell response to increased greenhouse gases, Geophys. Res. Lett., 45, 9197–9205. url
12. **Chemke, R.** and Dagan, G., 2018. The effects of the spatial distribution of anthropogenic aerosols radiative forcing on atmospheric circulation, J. Clim., 31, 7129-7145. url
11. **Chemke, R.** and Kaspi, Y., 2017. Dynamics of massive atmospheres, Astrophys. J., 845, 1. url
10. **Chemke, R.** 2017. Atmospheric energy transfer response to global warming, Quart. J. Roy. Meteor. Soc., 143, 2296–2308. url
9. **Chemke, R.**, Kaspi, Y. and Halevy, I., 2016. The thermodynamic effect of atmospheric mass on early Earth's temperature, Geophys. Res. Lett., 43, 11,414–11,422. url
8. Dagan, G. and **Chemke, R.**, 2016. The effect of subtropical aerosol loading on equatorial precipitation, Geophys. Res. Lett., 43, 11,048–11,056. url

7. **Chemke, R.**, Dror, T. and Kaspi, Y., 2016. Barotropic kinetic energy and enstrophy transfers in the atmosphere, Geophys. Res. Lett., 43, 7725-7734. url
6. **Chemke, R.** and Kaspi, Y., 2016. The effect of eddy-eddy interactions on jet formation and macroturbulent scales, J. Atmos. Sci., 73 (5), 2049-2059. url
5. **Chemke, R.** and Kaspi, Y., 2016. The latitudinal dependence of the oceanic barotropic eddy kinetic energy and macroturbulence energy transport, Geophys. Res. Lett., 43, 2723-2731. url
4. **Chemke, R.** and Kaspi, Y., 2015. The Latitudinal Dependence of Atmospheric Jet Scales and Macroturbulent Energy Cascades. J. Atmos. Sci., 72 (10), 3891–3907. url
3. **Chemke, R.** and Kaspi, Y., 2015. Poleward migration of eddy-driven jets, J. Adv. Model. Earth Syst., 07, 1457-1471. url
2. Rosenfeld, D., **Chemke, R.**, Prather, K., Suski, K., Comstock, J.M., Schmid, B., Tomlinson, J. and Jonsson, H., 2014. Polluting of winter convective clouds upon transition from ocean inland over central California: Contrasting case studies. Atmos. Res., 135, 112-127. url
1. Rosenfeld, D., **Chemke, R.**, DeMott, P., Sullivan, R.C., Rasmussen, R., McDonough, F., Comstock, J.M., Schmid, B., Tomlinson, J., Jonsson, H., Suski, K., Cazorla, A. and Prather, K., 2013. The common occurrence of highly supercooled drizzle and rain near the coastal regions of the western United States, J. Geophys. Res., 118(17), 9819-9833. url