

An early career researchers perspective on WCRP science

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WCRP 40th Anniversary Symposium, 8 December 2019



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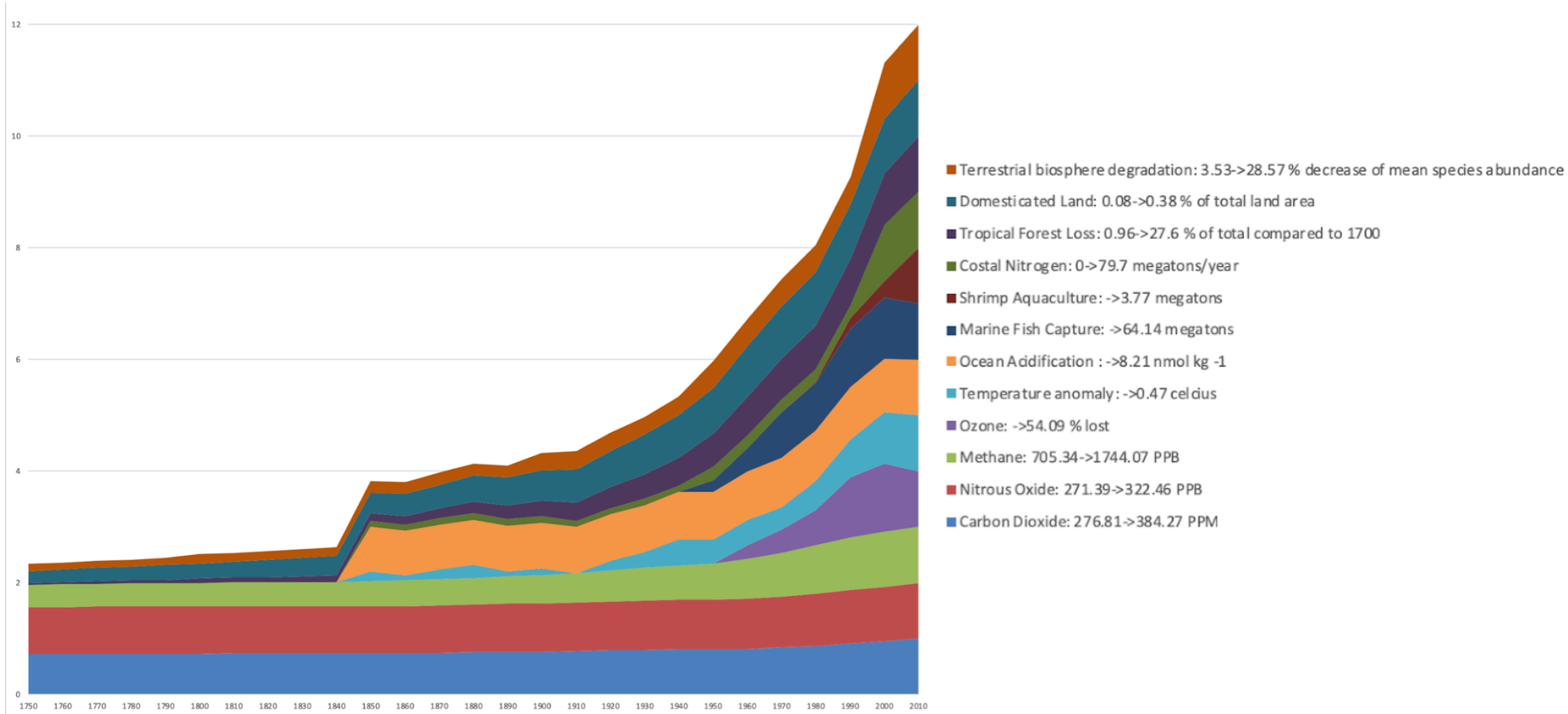


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Earth System Trends 1750 → 2010



Bryan MacKinnon, Source data: International Geosphere-Biosphere Programme www.igbp.net

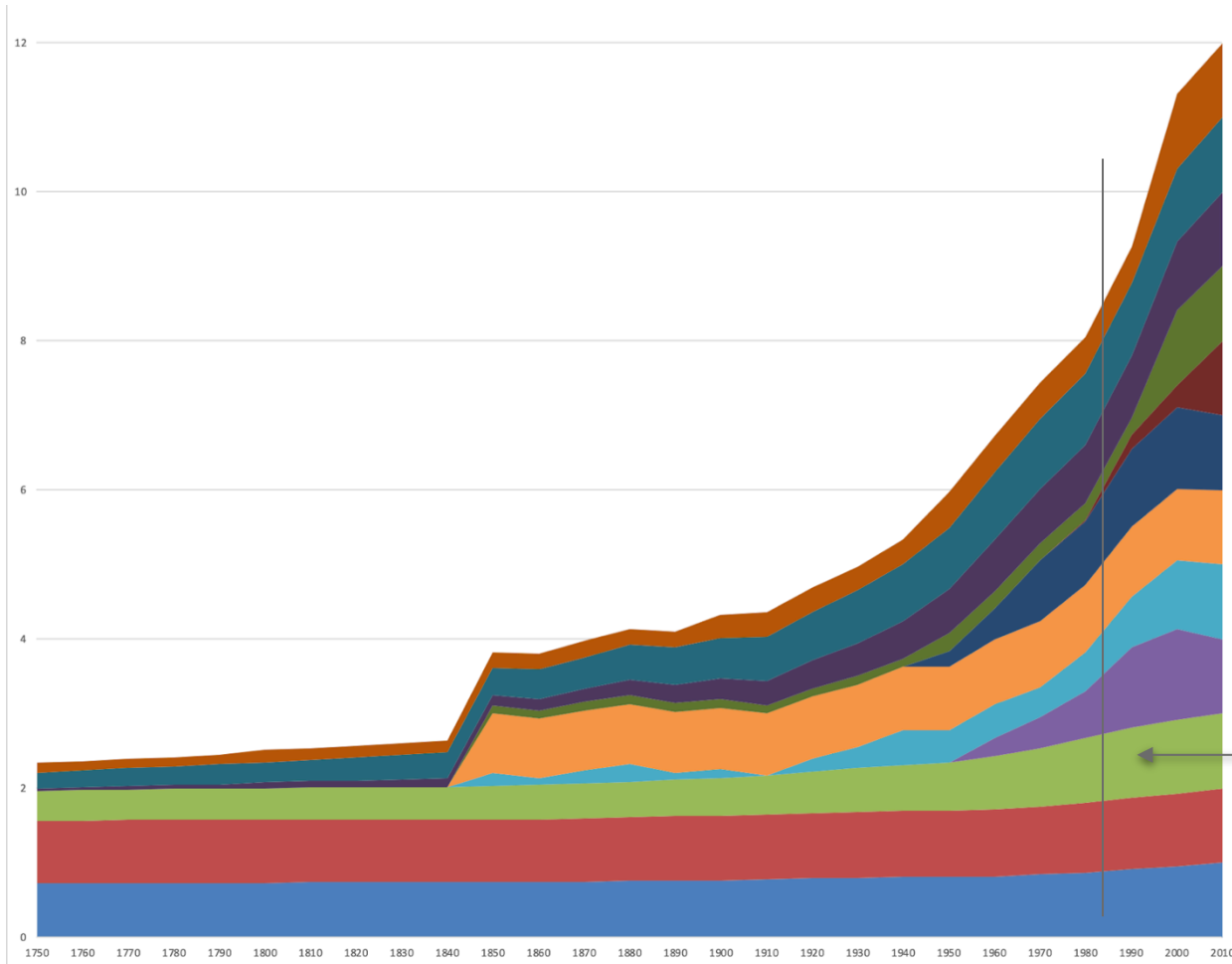


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Today's ECRs stepped in

Bryan MacKinnon, Source data: International Geosphere-Biosphere Programme www.igbp.net

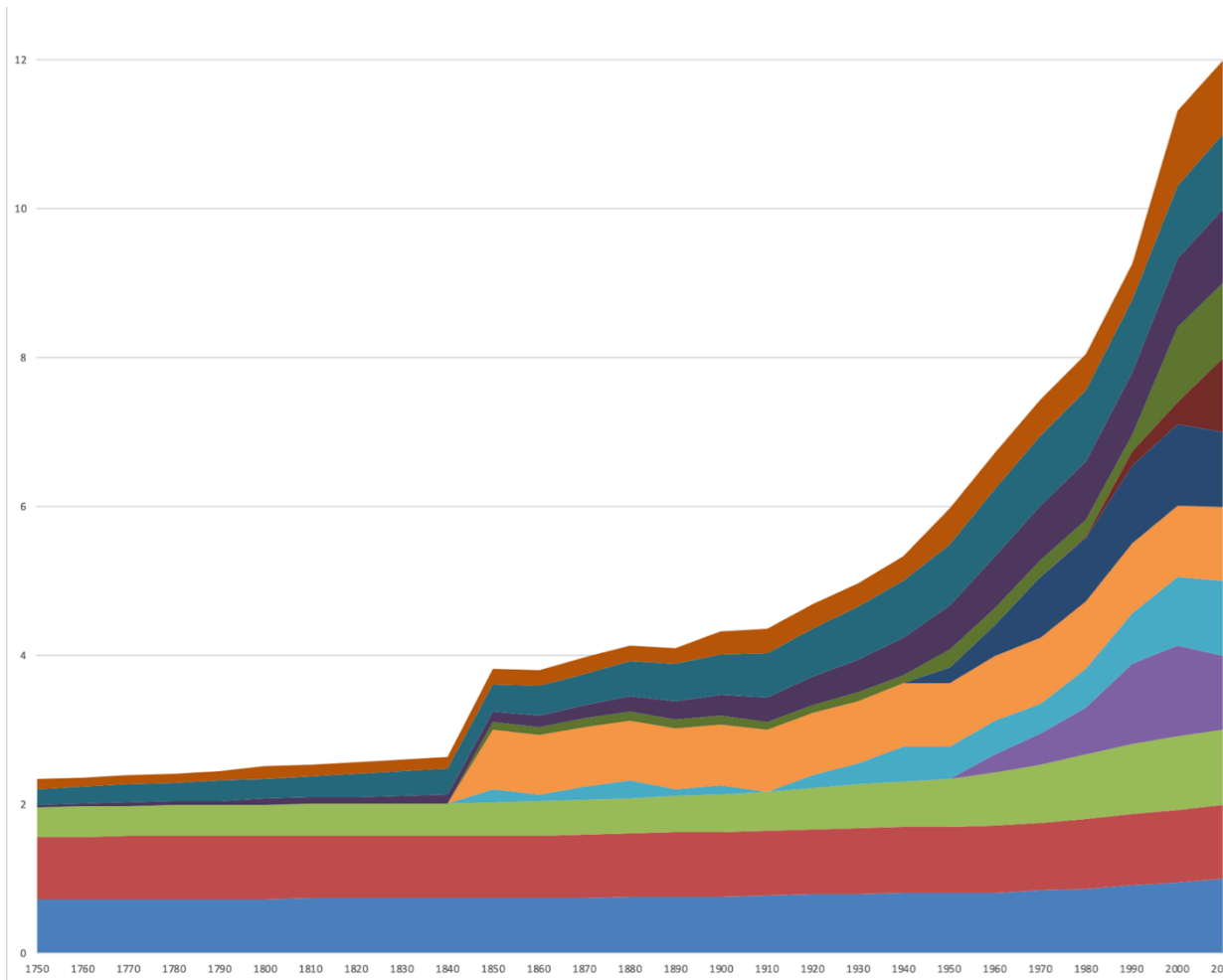


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Early career researchers have a critical role to support shaping the future of climate science



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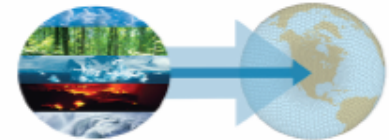
Earth System Science Frontiers in the 21st century

Defined by YESS and further described in the YESS white paper

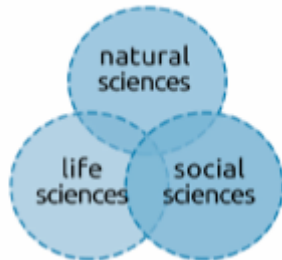
User-driven science



Scale-aware & seamless predictions



Interdisciplinarity



Robust communication



Rauser, F., Alqadi, M., Arowolo, S., Baker, N., Bedard, J., Behrens, E., Dogulu, N., Domingues, L.G., Frassoni, A., Keller, J. and Kirkpatrick, S., Langendijk G., Mirsafa M., Salauddin, M., Sonntag, S., Naumann A.K., Osman, M., Reed, K., Rothmuller, M., Schemann, V., Singh, A., Tummon, F., Dike, V., Villafuerte M.Q., Walawender J.P., Zaroug, M., 2017. Earth System Science Frontiers: An Early Career Perspective. *Bulletin of the American Meteorological Society*, 98(6), 1120-1127.

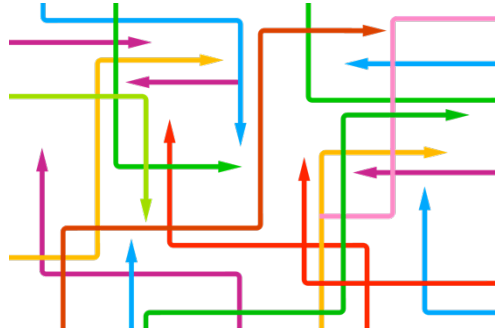


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I. Fundamental understanding



Continued effort on process understanding

Complex processes (e.g. snow, precip, carbon)

Biases & uncertainties

Across time and spatial scales



New observational methods

Evaluation and quality assessment

Integration with climate studies

Data sparse regions

Langendijk, et al. 2019. Three Ways Forward to Improve Regional Information for Extreme Events: An Early Career Perspective. Frontiers in Environmental Science.
Rauser, et al. 2017. Earth System Science Frontiers: An Early Career Perspective. Bulletin of the American Meteorological Society
Joint YESS-YHS-APECS ECR Workshop as a part of WCRP Climate Science Week, AGU 2019



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II. & III. Near and long term climate evolution



Seamless predictions

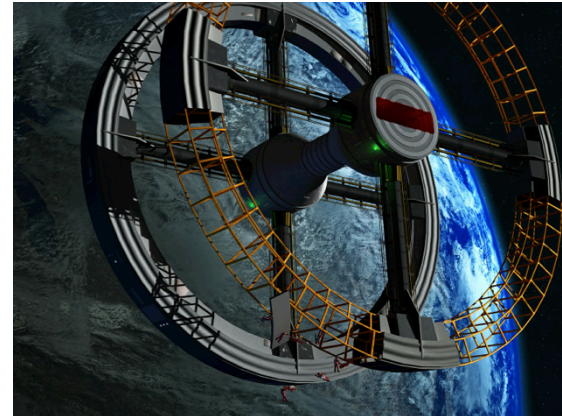


Human component in (ES)M

Collaborative modelling approach



Climate engineering



Langendijk, et al. 2019. *Three Ways Forward to Improve Regional Information for Extreme Events: An Early Career Perspective. Frontiers in Environmental Science.*
Rauser, et al. 2017. *Earth System Science Frontiers: An Early Career Perspective. Bulletin of the American Meteorological Society*
YESS review on WCRP SP community consultation. 2019
ICRC-CORDEX ECS event. 2019.
Joint YESS-YHS-APECS ECR Workshop as a part of WCRP Climate Science Week, AGU 2019

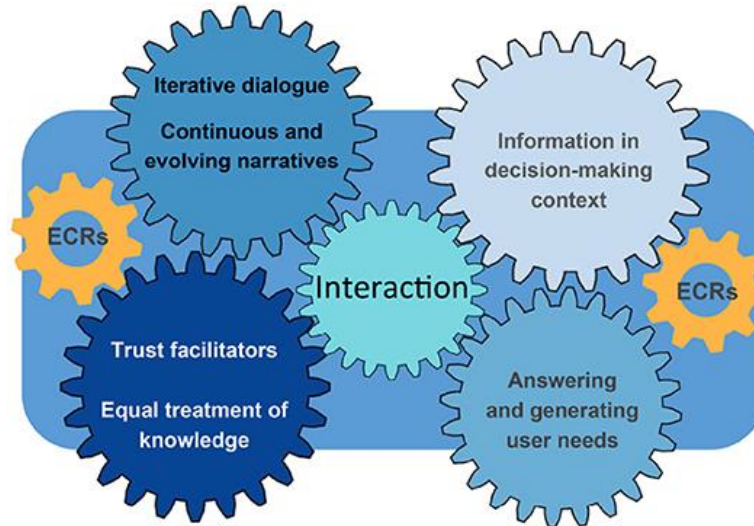


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IV. Science for society



Consolidation of post-processing data and information at different scales and for different users

Credibility and open access to data, publications and knowledge

Embrace inter-to-transdisciplinarity

Langendijk, et al. 2019. Three Ways Forward to Improve Regional Information for Extreme Events: An Early Career Perspective. Frontiers in Environmental Science.
Rauser, et al. 2017. Earth System Science Frontiers: An Early Career Perspective. Bulletin of the American Meteorological Society
Dike, et al. 2018. Obstacles facing Africa's young climate scientists. Nature Climate Change, 8, 447–449.
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Advancing early career engagement



How do we foster careers in an interdisciplinary setting retaining a disciplinary foundation?

How do we evaluate scientific excellence?

Jørgensen, P. S., Evoh, C. J., Gerhardinger, L. C., Hughes, A. C., Langendijk, G. S., Moersberger, H., Jay Pocklington, J., Mukherjee, N. 2019. Building urgent intergenerational bridges: assessing early career researcher integration in global sustainability initiatives. Current Opinion in Environmental Sustainability, 39, 153-159.

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Early career researchers are excited to **continue and innovate** the **excellent scientific work** under the WCRP programme for the **further advancement of climate science**



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References:

Rauser, F., Alqadi, M., Arowolo, S., Baker, N., Bedard, J., Behrens, E., Dogulu, N., Domingues, L.G., Frassoni, A., Keller, J. and Kirkpatrick, S., Langendijk G., Mirsafa M., Salauddin, M., Sonntag, S., Naumann A.K., Osman, M., Reed, K., Rothmuller, M., Schemann, V., Singh, A., Tummon, F., Dike, V., Villafuerte M.Q., Walawender J.P., Zaroug, M., 2017. Earth System Science Frontiers: An Early Career Perspective. *Bulletin of the American Meteorological Society*, 98(6), 1120-1127.

Langendijk, G.S., Aubry-Wake, C., Osman, M., Gulizia, C., Attig-Bahar, F., Behrens, E., Bertoncini, A., Hart, N., Indasi, V.S., Innocenti, S., van der Linden, E.C., Mamnun, N., Rasouli, K., Reed, K.A., Ridder, N., Rivera, J., Ruscica, R., Ukazu, B.U., Walawender, J.P., Walker, D.P., Woodhams, B.J. and Yilmaz, Y.A., 2019. Three Ways Forward to Improve Regional Information for Extreme Events: An Early Career Perspective. *Frontiers in Environmental Science*. 7:6.

Dike, V.N., Addi, M. Andang´o, H.A., Attig, B.F., Barimalala, R., Diasso, U.J., Plessis, M.D., Lamine, S., Nongwe, P.N., Zaroug, M., Ochanda, K.V., 2018. Obstacles facing Africa’s young climate scientists. *Nature Climate Change*, 8, 447–449.

Jørgensen, P. S., Evoh, C. J., Gerhardinger, L. C., Hughes, A. C., Langendijk, G. S., Moersberger, H., Jay Pocklington, J., Mukherjee, N. 2019. Building urgent intergenerational bridges: assessing early career researcher integration in global sustainability initiatives. *Current Opinion in Environmental Sustainability*, 39, 153-159.

ICRC-CORDEX, ECS Event. 2019: http://icrc-cordex2019.cordex.org/wp-content/uploads/sites/2/2019/11/ECS_Event_report-2.pdf

Joint YESS-YHS-APECS ECR Workshop as a part of WCRP Climate Science Week, AGU 2019
<https://www.wcrp-climate.org/wcrp-agu2019/wcrp-csw-ecw>

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