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Jeroen E Sonke, PhD
Directeur de Recherche CNRS, Laboratoire Géosciences Environnement Toulouse
Toulouse, France, t.+33 5 61 33 26 06 email : jeroen.sonke@get.omp.eu

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Dear members of CNRS section 19,

Hélène Angot has asked me to write a reference letter in support of her 2021 CNRS section 19 CRCN application, with IGE as host laboratory. I know Hélène since her PhD work at the LGGE on southern hemisphere atmospheric mercury dynamics, and I acted as reviewer on her PhD jury in 2016. Over the past decade the work of Hélène and the CHIANTI team at IGE has been instrumental in understanding how southern hemisphere mercury cycling is different from the northern hemisphere, a developing story dictated by differences in land-ocean distribution and atmospheric oxidants. Hélène's PhD was excellent and productive, leading to four 1st authored and several co-authored papers. Hélène's talents are multiple: she is critical, efficient, has a broad science background, experience in both field observations and numerical modeling, and she writes well in both French and English.

It is to her credit that she has made deliberate strategic choices in her early career by acquiring numerical modeling (GEOS-Chem) and environmental policy expertise at MIT, and by exploring global carbon biogeochemistry at the Univ. of Boulder. She has chosen to work with top US scientists in the mercury and carbon cycling fields, Noelle Selin and Detlev Helmig, no doubt stimulating her biogeochemistry knowledge and an important step in defining her CNRS research proposal.

France has a veritable culture of mercury science, with specialists in all but one field: global mercury modeling. All of us at GET, IPREM, MIO, and IGE are capable of making the best and most innovative atmospheric, marine, terrestrial or molecular mercury observations. Yet we always face a wall, where the impact of our novel observations can only be illustrated with a global mercury cycling model. We then turn to MIT, to Harvard and China for modeling support in mostly frustrating, inefficient collaborations. Hélène Angot has designed a CNRS project based on state of the art Earth system modeling that addresses critical questions in modern mercury science: how will global change affect mercury cycling, in particular in the Arctic where permafrost constitutes the largest surface Earth mercury reservoir. How do wildfires, permafrost degradation, sea-ice disappearance affect mercury mobilization to the atmosphere and the rest of the planet? Hélène proposes an excellent strategy, coupling for the first time two of the best terrestrial and ocean-atmosphere models (ORCHIDEE and GEOS-Chem/MITgcm). She has also succeeded, where sadly many of us in France have failed, to secure funding and be part of the recent year-long MOSAiC expedition in the Arctic Ocean. She was the only person collecting real-time atmospheric mercury observations during this campaign that will likely bring a breakthrough in understanding dark, wintertime atmospheric mercury chemistry, and an annual mass balance of central Arctic Ocean – air exchange of mercury. With her unique modeling and observation expertise, Hélène has the capacity to take mercury science to the next level in France and internationally, connecting the dots between different mercury disciplines. I encourage you

to once more invite her to the orals stage of the 2021 CNRS CRCN concours, and listen to her in person. Hiring Helene would be a strategic and highly efficient move for environmental science at CNRS.

Sincerely,
Jeroen Sonke