We propose 4 new PDRMIP simulations:

1) **Halocarbons**
    a. CFC-12: From present-day mixing ratio to 5 ppb (we used 535 ppt for present-day)
    b. If you have a lot of computer resources we suggest the additional two runs
        i. CFC-11: From present-day mixing ratio to 5 ppb (we used 653.45 ppt for present-day (this accounts also for other halocarbon gases))
        ii. N2O: From present-day mixing ratio to 1 ppm (we used 316 ppb for present-day)

   For case a) the base case is 535 ppt for the CFC-12 concentration and the perturbed case of 5 ppb. If you have slightly different CFC-12 concentration in your already performed base case, you can just perform a perturbed run with increase in the CFC-12 concentration of 4465 ppt.

2) **Ozone**

   5 times the tropospheric ozone distribution (TROP) used in the paper by MacIntosh et al. (2016). Bjørn will regrid the ozone fields to your model grid similar to BC for several of the models. Send model grid information to Bjørn, but it may take some time before this is ready. The existing base case can be used with perturbed run of 5 times the TROP concentration from MacIntosh et al. (2016).

3) **Land use change**

   Use the pre industrial vegetation from your control pi CMIP5 simulations and current vegetation for the BASE simulation (the latter already performed for PDRMIP models). The main change in vegetation from pi control to present (base) should be the amount of cropland. We expect the land use change to be quite different in the PDRMIP models, but it would require a lot of work to impose the same vegetation types in the models. Also for this experiment it should be sufficient with one perturbed simulation of pi control vegetation.

   Is important that you provide snow cover and snow depth as additional output variables from this experiment. If possible, we would be interested in the vegetation data, at least the change in cropland.

4) **BCx10 with shorter lifetime**

   This experiment is only for models running with aerosol concentration based fields, except if you are able to tune the wet deposition for BC lifetime of around 3 days. Bjørn will provide BC concentration fields for those interested. We encourage double radiation calls!

To join these experiments, perform fixed SST and coupled runs as in first phase of PDRMIP. The fixed SST should be at least 15 years, and especially for the land use change experiment it would be useful with 30 years. The coupled runs should be 100 years as earlier. Use the naming convention as files in the renamed directory at Norstore or EXCATLY how you have done before!

MacIntosh, C. R., Allan, R. P., Baker, L. H., Bellouin, N., Collins, W., Mousavi, Z. and Shine, K. P.: Contrasting fast precipitation responses to tropospheric and stratospheric ozone forcing, Geophysical Research Letters, 43(3), 1263-1271, 2016.