

Dear Dr Añel,

Our apologies for this – we had presumed that openly available access to the code and data would suffice for the Discussion phase. We have now permanently published the code and supporting data at:

- 5 **Website:** <https://data.4tu.nl/datasets/d7c8091b-fc2b-4c21-a498-d4a01c9a7a40>
DOI: 10.4121/d7c8091b-fc2b-4c21-a498-d4a01c9a7a40.

While testing the DOI software submission, we unfortunately realised that the development version of the `pySINDy` library (1.7.6.dev358+g15e8093) we used is no longer publicly available. To ensure our work remains fully reproducible, we have updated our code to use more recent public versions of the `pySINDy` and `pyDMD` libraries, versions 2.0.0 and 2025.03.01, respectively. This results in minor numerical changes to our results, but it does not affect the conclusions of our work. Notably, the newer implementation of two variations of the DMD algorithms produce smaller errors and the weak form of the SINDy algorithm is more stable in propagation, resulting in more valid data points. Below we reproduce Table 1 of the submitted manuscript, with tracked changes showing how the new library versions change some of the results. The biggest change is for the S2 dataset with the weak form POD-SINDy, where we were previously unable to find a stable model this has improved with the new library version. Despite the numerical changes, the conclusions from our work do not change from the submitted manuscript.

As we work on addressing the reviewer’s comments, we will update our results to the values from the new version of the code, this will result in some minor numerical changes and updates to the figures.

Table 1. Table 2 in submitted manuscript with tracked changes. Presents RMSE (root mean squared error) of the reconstruction (R) and forecast (F) of mean changes in global column ozone for the DMD and POD-SINDy methods over the datasets in Dobson Units. Values in blue correspond to the updated values. Values in **bold** indicate RMSE’s lower than the propagation of the temporal mean (Data mean).

		DMD	OptDMD	OptDMD-C	BOPDMD	POD-SINDy	POD-SINDy (ensemble)	POD-SINDy (weak form)	Data mean
SAS204	R	0.08	0.08	0.06	0.076	0.12	0.112	0.267	0.09
	F	0.28	0.28	0.249	0.289	0.23	0.1721	0.09	0.28
TAC204	R	0.10	0.12	0.046	0.069	0.17	0.17	0.11	0.17
	F	0.27	0.29	0.223	0.2330	0.24	0.25	0.234	0.30
SAS162	R	0.04	0.04	0.012	0.023	0.05	0.05	0.065	0.05
	F	70.07	0.07	0.067	0.07	0.06	0.06	0.056	0.07
TAC162	R	0.05	0.04	0.02	0.04	0.06	0.05	0.07	0.04
	F	0.09	0.09	0.0940	0.078	0.05	0.04	0.046	0.09
S1	R	0.05	0.06	0.023	0.056	0.09	0.09	0.079	0.07
	F	0.09	0.08	0.1209	0.09	0.07	0.07	0.075	0.09
S2	R	0.15	0.16	0.087	0.0811	0.24	0.24	0.21214	0.20
	F	0.15	0.14	0.23	0.186	0.22	0.22	0.12144	0.15
S3	R	0.03	0.03	0.01	0.032	0.04	0.04	0.043	0.03
	F	0.05	0.05	0.053	0.057	0.06	0.06	0.065	0.05

20 Thank you for your consideration

Sincerely, on behalf of all the authors,

Irene Dedoussi