

# Supporting Information for "Implementation of a machine-learned gas optics parameterization in the ECMWF Integrated Forecasting System"

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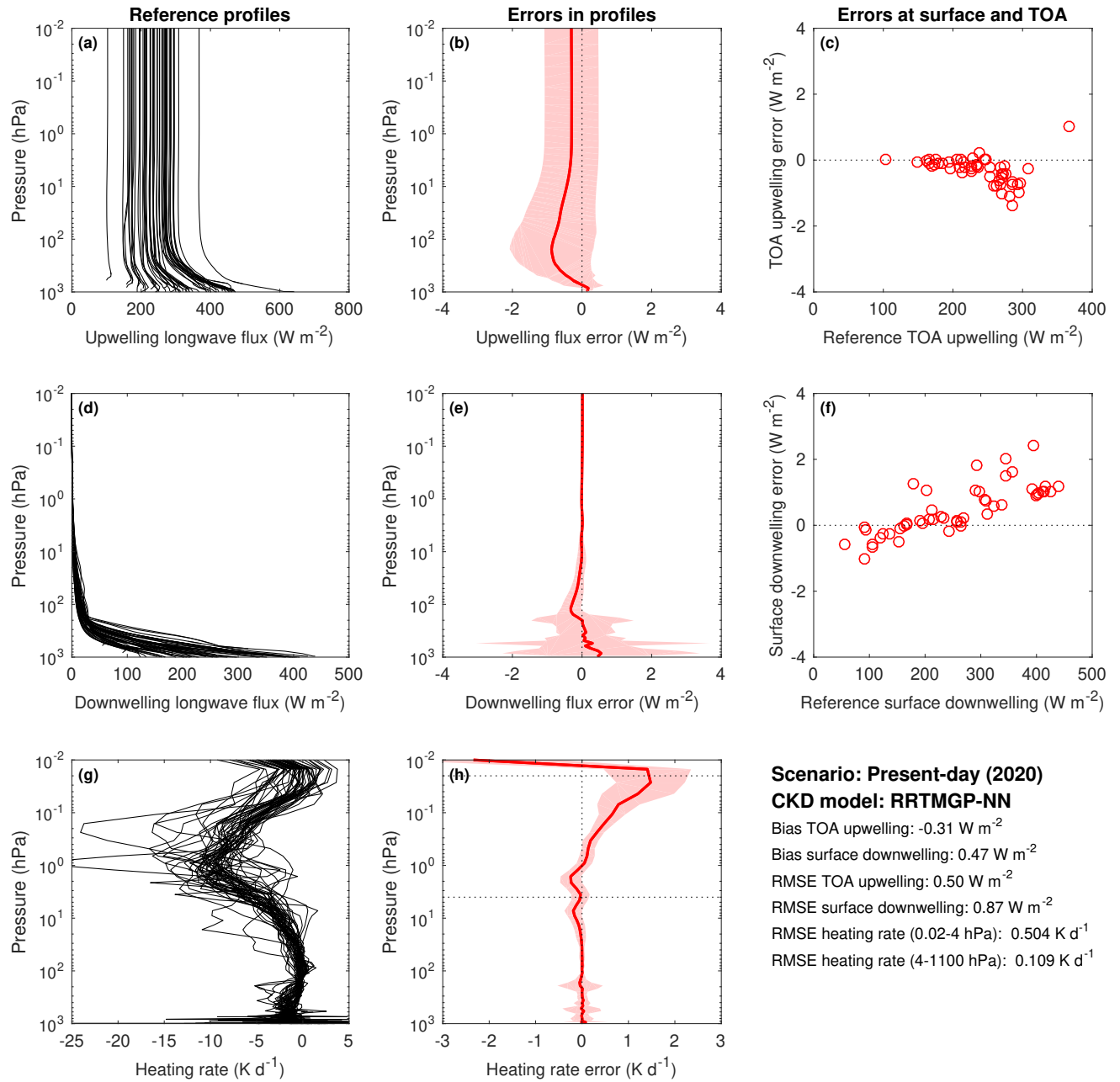
<sup>2</sup>European Centre for Medium-Range Weather Forecasts

## Contents of this file

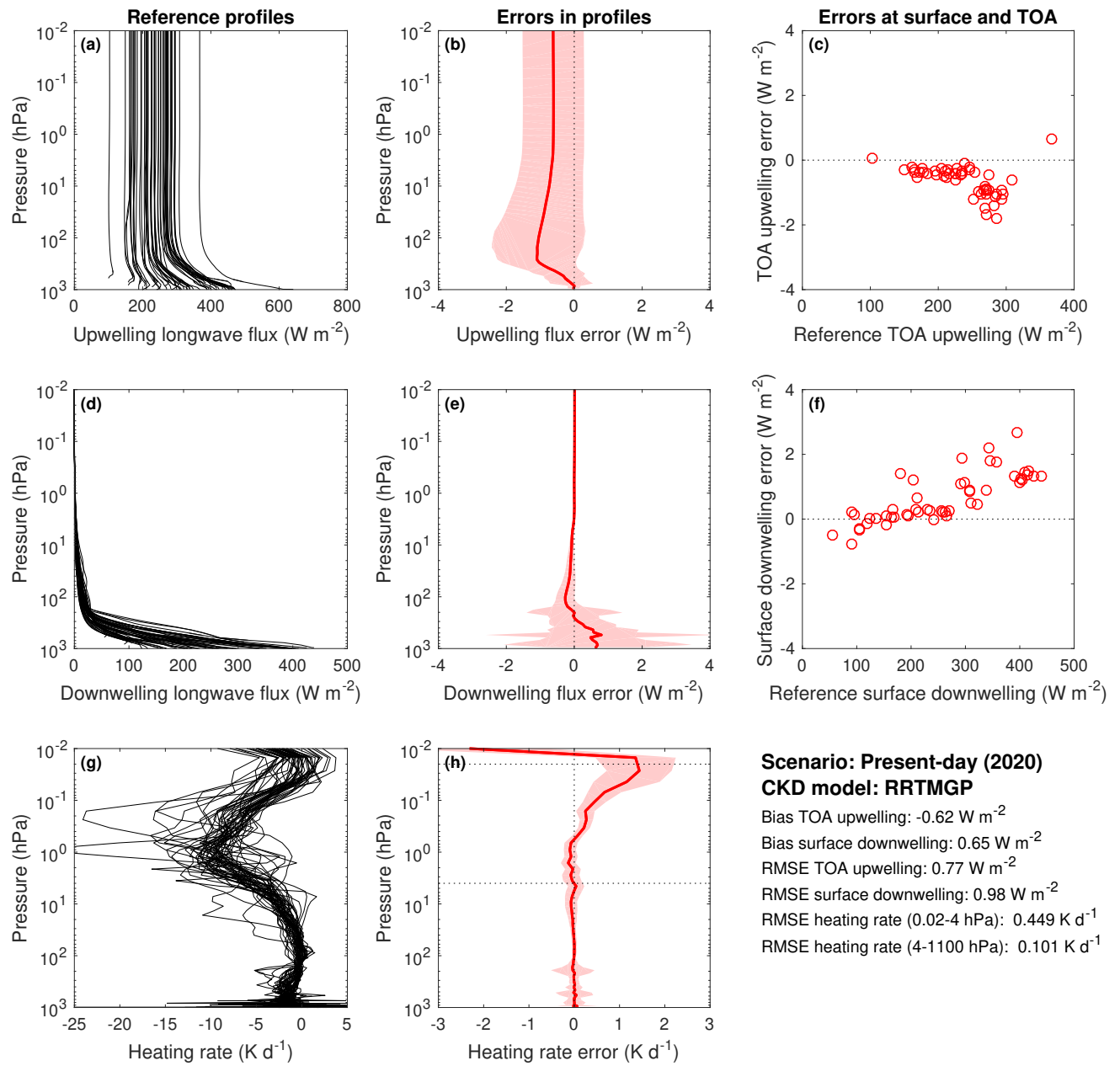
1. Figures S1 to S4

## Introduction

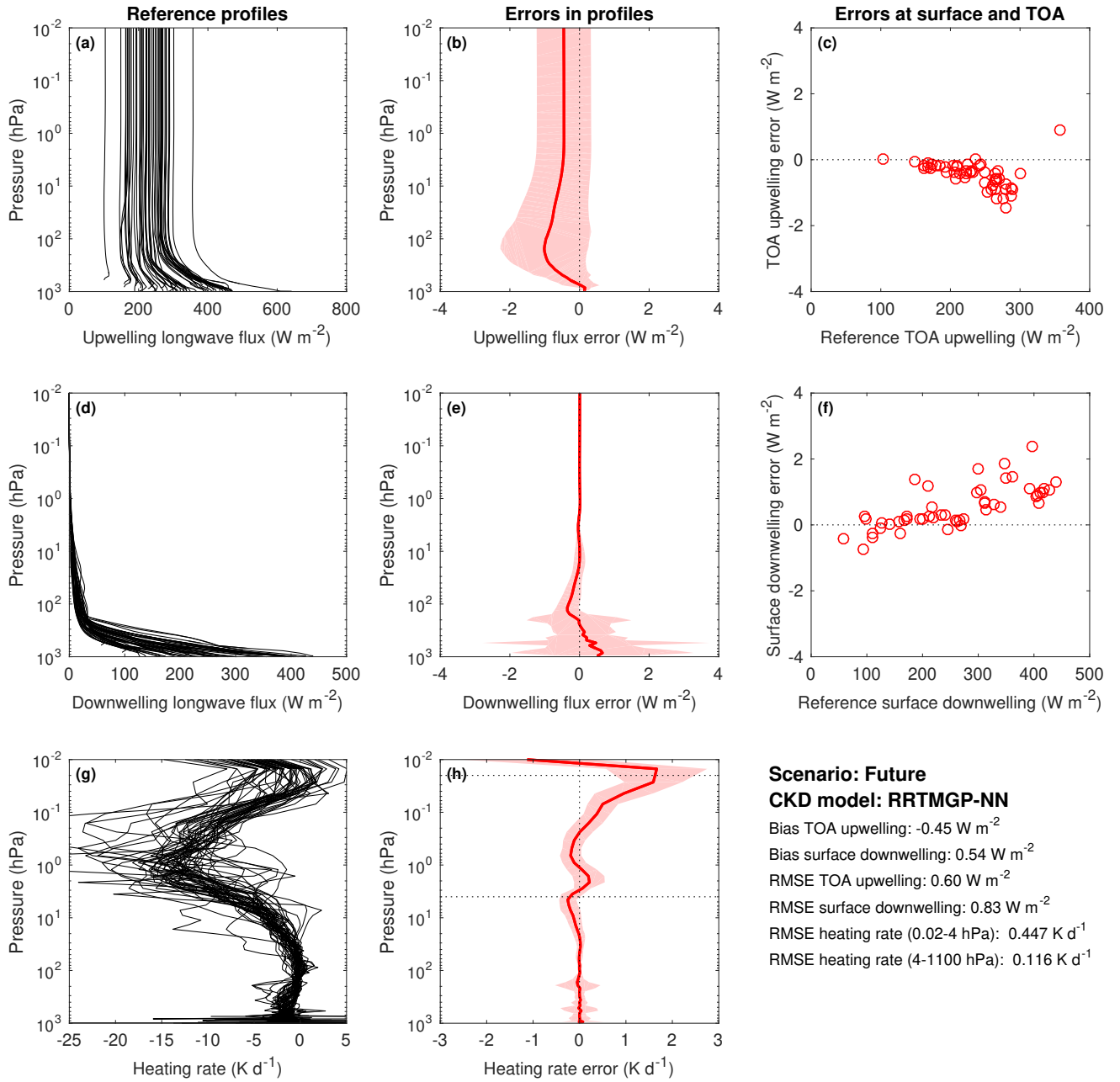
This file contains longwave results for the RRTMGP gas optics model with reduced spectral resolution (Reduced-RRTMGP), and its neural network (NN) version, using the experiment protocol, data and tools from the Correlated K-Distribution Model Inter-comparison Project (CKDMIP). Four figures are included, corresponding to different gas optics models and gas concentration scenarios: RRTMGP-NN, present-day (Fig. S1), RRTMGP, present-day (Fig. S2), RRTMGP-NN, future (Fig. S3), and RRTMGP, future (Fig. S4). The calculations were performed using a no-scattering solver with four discrete zenith angles in each hemisphere.



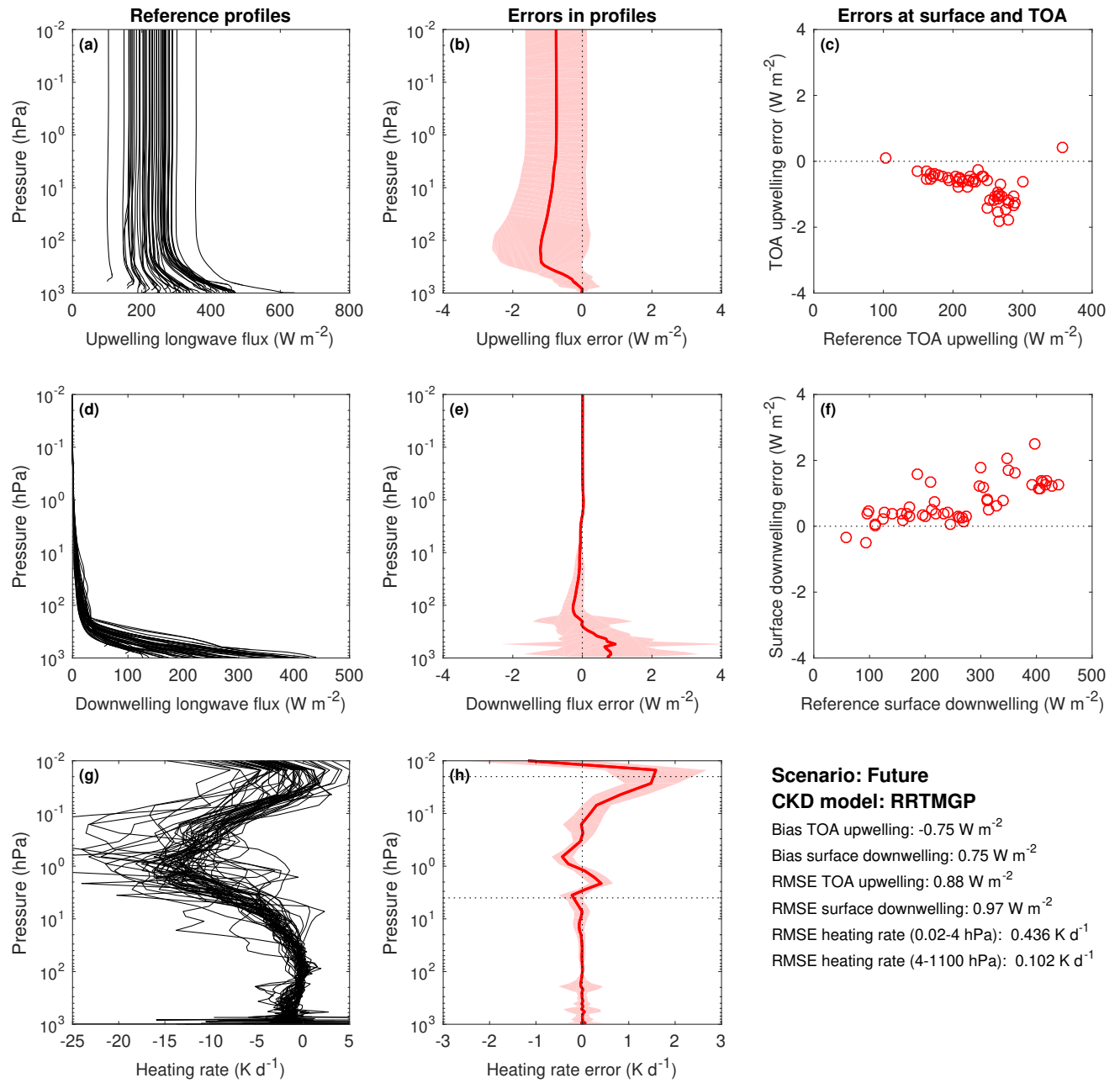
**Figure S1.** Evaluation of Reduced-RRTMGP-NN longwave fluxes and heating rates using the 50 independent profiles of the CKDMIP Evaluation-1 dataset with present-day concentrations of greenhouse gases. Reference profiles of upwelling, downwelling flux and heating rate from LBL calculations, corresponding errors (b, e, h) with solid lines showing bias and the shaded area giving the 95th percentile of errors, and instantaneous errors in upwelling TOA and downwelling surface fluxes (c, f).



**Figure S2.** As in Fig. S1 but for the original Reduced-RRTMGP.



**Figure S3.** As in Fig. S1 but for the future scenario.



**Figure S4.** As in Fig. S1 but for the future scenario and Reduced-RRTMGP.