

Webb et al. Supplementary Information

Data Availability:

The underlying modelled climatology data and their validation against ground-based data have been previously published [reference 15]. The model, all model input data, and the data against which the model was validated are freely available online from international geophysical data centres.

The model itself is available at <http://www.libradtran.org>

The input data are available from:

<https://ozoneaq.gsfc.nasa.gov/data/toms/> (TOMS ozone)

<https://disc.sci.gsfc.nasa.gov/Aura/data-holdings/OMI> (OMI ozone)

<http://modis.gsfc.nasa.gov> (Cloud cover and optical depth; Aerosol optical depth)

<http://www.temis.nl/data/topo/dem2grid.html> (Digital elevation data)

The measured ground-based data used for validation are available at <http://www.woudc.org>

The full *in vivo* human data set is available from Professor L.E. Rhodes.

The data for circulating 25OHD by month in a white Caucasian adult population was previously published [reference 8, Figure 1].

The change in circulating 25OHD after a 6 week course of simulated sunlight exposures has been previously published [reference 14, Figure 1].

Raw data used for regression of February on September 25OHD levels for healthy white Caucasian adults is given below.

id	diagnosis	photosen	sep25ohd	feb25ohd
121	Healthy	0	34.2	21.8
122	Healthy	0	19.9	14.1
123	Healthy	0	19.4	21
124	Healthy	0	16.8	7.5
125	Healthy	0	52.9	38.3
126	Healthy	0	13.7	8.9
127	Healthy	0	28.7	16.2
128	Healthy	0	22	13.1
129	Healthy	0	25.5	11.2
130	Healthy	0	10.4	3.9
131	Healthy	0	17.9	11.4
132	Healthy	0	30.3	16.2

133	Healthy	0	31.7	18.2
134	Healthy	0	28.7	19.5
135	Healthy	0	15.8	6.1
136	Healthy	0	35.7	10.4
137	Healthy	0	8.1	4.1
138	Healthy	0	22.7	22
139	Healthy	0	41.7	35.7
140	Healthy	0	28.4	13.7
141	Healthy	0	27.7	30.4
142	Healthy	0	31.2	20.4
143	Healthy	0	17.7	15.7
145	Healthy	0	31.4	14.1
146	Healthy	0	29.1	19.6
147	Healthy	0	24.6	22.8
148	Healthy	0	25.7	21.2
150	Healthy	0	29.3	18.2
151	Healthy	0	17.4	7.5
152	Healthy	0	39.3	24.5
154	Healthy	0	23.5	20
155	Healthy	0	28.7	16.8
156	Healthy	0		22.9
157	Healthy	0	28	12.3
159	Healthy	0	45.6	42.6
160	Healthy	0	33.9	20.9
161	Healthy	0	22.5	9.5
162	Healthy	0	23	16.9
163	Healthy	0	51.4	42.9
164	Healthy	0	16.7	8.3
165	Healthy	0	11.7	4.4
166	Healthy	0	9.9	4.4
168	Healthy	0	38.9	16.9
169	Healthy	0	29.5	26.5
170	Healthy	0	23.4	10.9
171	Healthy	0	27.9	17.3
172	Healthy	0	5.4	
176	Healthy	0	29.9	14.1
178	Healthy	0	29.8	14.8
179	Healthy	0	30.3	33
181	Healthy	0	38.4	22.4
182	Healthy	0	19.2	15.5
183	Healthy	0	30	20.3
184	Healthy	0	12.7	5.7
185	Healthy	0	19.6	4.7
186	Healthy	0	22.4	11.8

187	Healthy	0		
189	Healthy	0	39.7	18.2
190	Healthy	0	29.5	15.8
191	Healthy	0	18.7	14.6
192	Healthy	0	38.7	25.3
193	Healthy	0	35.1	20.9
194	Healthy	0	19.4	13.7
195	Healthy	0	36.3	21.1
196	Healthy	0	74.7	46.2
197	Healthy	0	32.9	14.6
198	Healthy	0	29.2	11.4
199	Healthy	0	29.2	21.1
200	Healthy	0	23.8	23.8
201	Healthy	0	26	11.9
202	Healthy	0	12.1	11
203	Healthy	0	35.5	15.3
204	Healthy	0	32.4	23.4
205	Healthy	0	47.6	31.3
206	Healthy	0	13.9	8.1
207	Healthy	0	40.9	28
208	Healthy	0	26.5	24.2
209	Healthy	0	34.4	21.7
210	Healthy	0	23.1	18.2
212	Healthy	0	35	30.3
213	Healthy	0	19	37.4
214	Healthy	0	24.8	19.4
215	Healthy	0	54.3	34.7
216	Healthy	0	39.7	22.8
217	Healthy	0	30.5	13.1
219	Healthy	0	18.5	19.3
220	Healthy	0	31.3	22.4
221	Healthy	0	28.2	15.1
222	Healthy	0	24.2	20.3
223	Healthy	0	46.3	25.9
224	Healthy	0	32.3	8.6
226	Healthy	0	31	22.8
227	Healthy	0	35.3	18.9
228	Healthy	0	31.3	21
229	Healthy	0	49.1	17.8
230	Healthy	0	27.5	19.5
232	Healthy	0	14.7	6.9
233	Healthy	0	22.4	23.9
234	Healthy	0	25.3	15.1
235	Healthy	0	39	26.6

237	Healthy	0	21	10
238	Healthy	0	30.4	10.3
239	Healthy	0	28.5	13.2
240	Healthy	0	17.6	7.2
241	Healthy	0	31.9	26.6
242	Healthy	0	20.3	9.6
243	Healthy	0	31.6	27.8
244	Healthy	0	38.1	20.6
245	Healthy	0	30.6	12.3