

Optimización de la búsqueda de parámetros atmosféricos en modelos de transferencia radiativa

- Gamaliel López-Padilla • giovannilopez9808@gmail.com

Modelos de transferencia radiativa

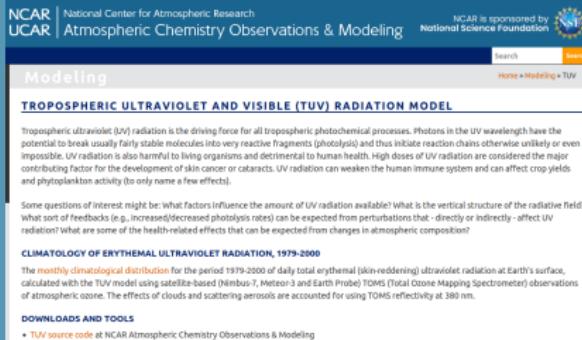


Figure 1: Tropospheric Ultraviolet and Visible (TUV) radiation model. [1]

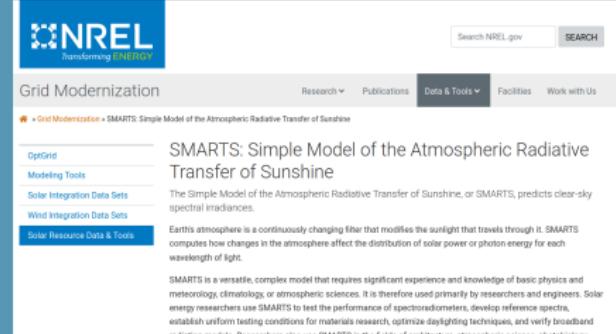


Figure 2: Simple Model of the Atmospheric Radiative Transfer of Sunshine. [2]

¿Qué hacen estos
modelos?

$$\frac{dE}{dAdt} = I_\nu(\hat{k}, \vec{r}, t) \vec{k} \cdot \vec{n} d\Omega d\nu [3]$$

```
'AOD=0.041 '
2
25.750 0.476 0
1
'USSA'
1
0
1 0.2740
0
3
390
0
'S&F_URBAN'
5
0.041 2
18
1
51 37.0 180.0
285 2800 1 1366.1
2
285 2800 1
1
4
1
0 2.9 0
0
0
1
3
2015 1 11 8.2167 25.75 -100.255 -6
```

```
TUV inputs:
=====
infil =      CDMX    outfitl =      cdmx   nstr =      -2
lat =      19.420   lon =      -99.145  tmzone =     -6.0
iyear =      2016    imonth =      1       iday =      9
zstart =      2.245   zstop =      80.000  nz =      81
wstart =      280.000  wstop =      400.000 nwint =     120
tstart =      10.000   tstop =      15.000  nt =      61
lzenit =      F       alsurf =      0.080   psurf =     -999.0
o3col =      228.380   so2col =      0.000   no2col =     0.100
tauclu =      0.000   zbase =      4.000   ztop =      5.000
tauaer =      0.061   ssaaer =      0.800   alpha =     1.000
dirsun =      1.000   difdn =      1.000   difup =     0.000
zout =      2.245   zaird =     -9.990E+02 ztemp =     -999.000
lirrad =      T       laflux =      F       lmmech =     F
lrates =      T       isfix =      0       nms =      2
ljvals =      F       ijfix =      0       nmj =      0
iwfix =      0       itfix =      0       izfix =     0
=====
```

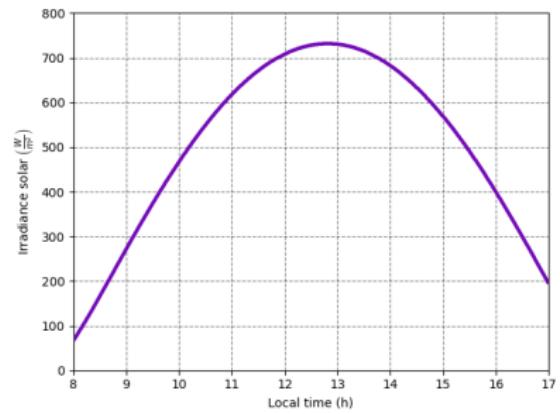
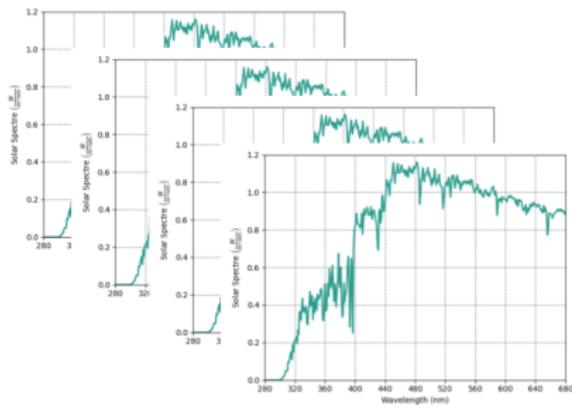
Figure 4: Archivo de inputs del modelo TUV

Figure 3: Archivo de inputs del modelo SMARTS

$$I(t) = \int_{\lambda_0}^{\lambda_i} E(\lambda, t) d\lambda \quad (1)$$

```
# Calculo de la irradiancia solar a partir de los resultados del
# modelo SMARTS
size = np.size(irradiance)
integral = irradiance[0]
for i in range(1, size):
    integral += irradiance[i]*(wavelength[i]-wavelength[i-1])
```

Figure 5: Implementación de la ecuación 1.



Mediciones in situ

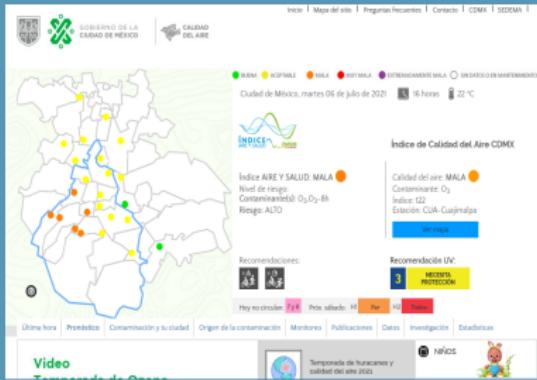


Figure 6: Página web de la SEDEMA. [4]



Figure 7: Página web del SIMA. [5]

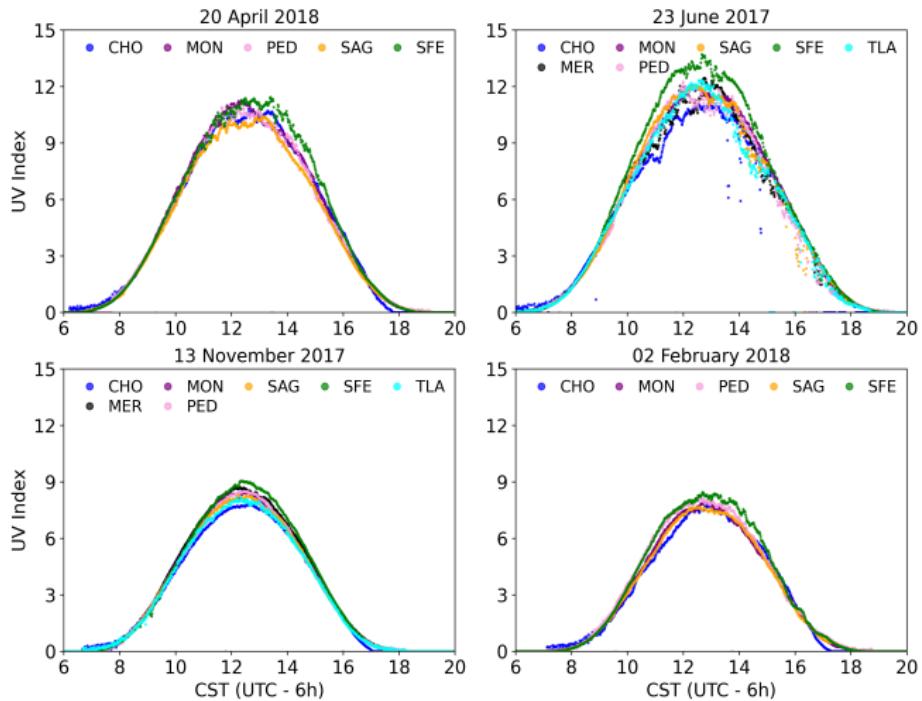


Figure 8: Mediciones de indice UV en la Ciudad de México. [4]



THANK YOU

- [1] NCAR, "Atmospheric chemistry observations & modeling." <https://www2.acom.ucar.edu/modeling/tropospheric-ultraviolet-and-visible-tuv-radiation-model>, 7 2021.
- [2] NREL, "Smarts: Simple model of the atmospheric radiative transfer of sunshine." <https://www.nrel.gov/grid/solar-resource/smarts.html>, 7 2021.
- [3] A. Carramiñana, *Transferencia radiativa*, ch. 2, pp. 1–24.
INAOE, 8 2020.
<https://www.inaoep.mx/~alberto/cursos/radiacion/cap2.pdf>.
- [4] SEDEMA, "Sistema de Monitoreo Atmosférico,Ciudad de México." <http://www.aire.cdmx.gob.mx/default.php?opc=%27aKBhnml=%27&opcion=bQ==>.
- [5] SIMA, "Sistema integral de monitoreo ambiental." <http://aire.nl.gob.mx/>.