

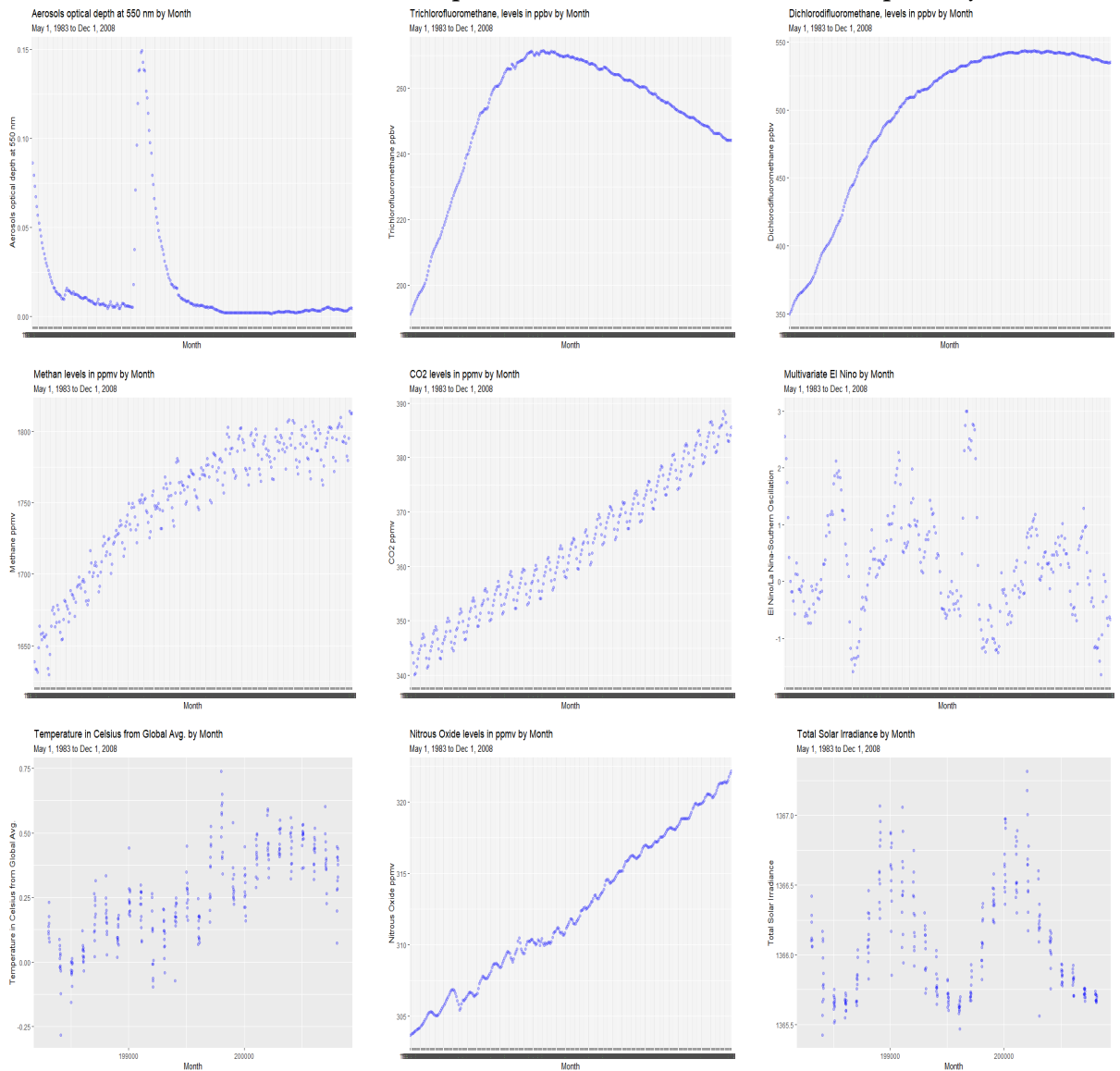
# Climate Change Metrics Analysis

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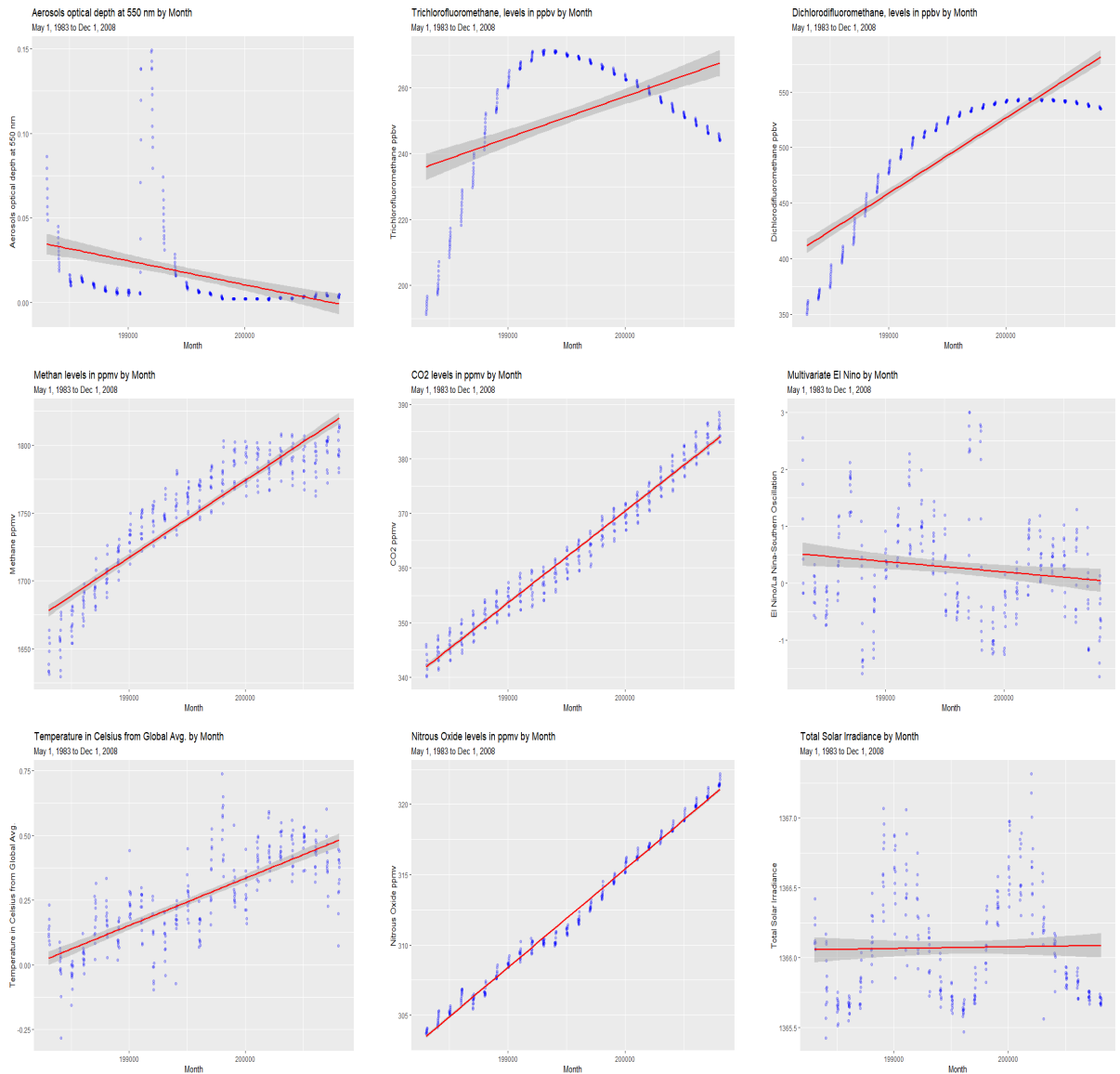
## Exercise 1

1. Plot all the variables in different scatterplot for all the months over all the reported years.



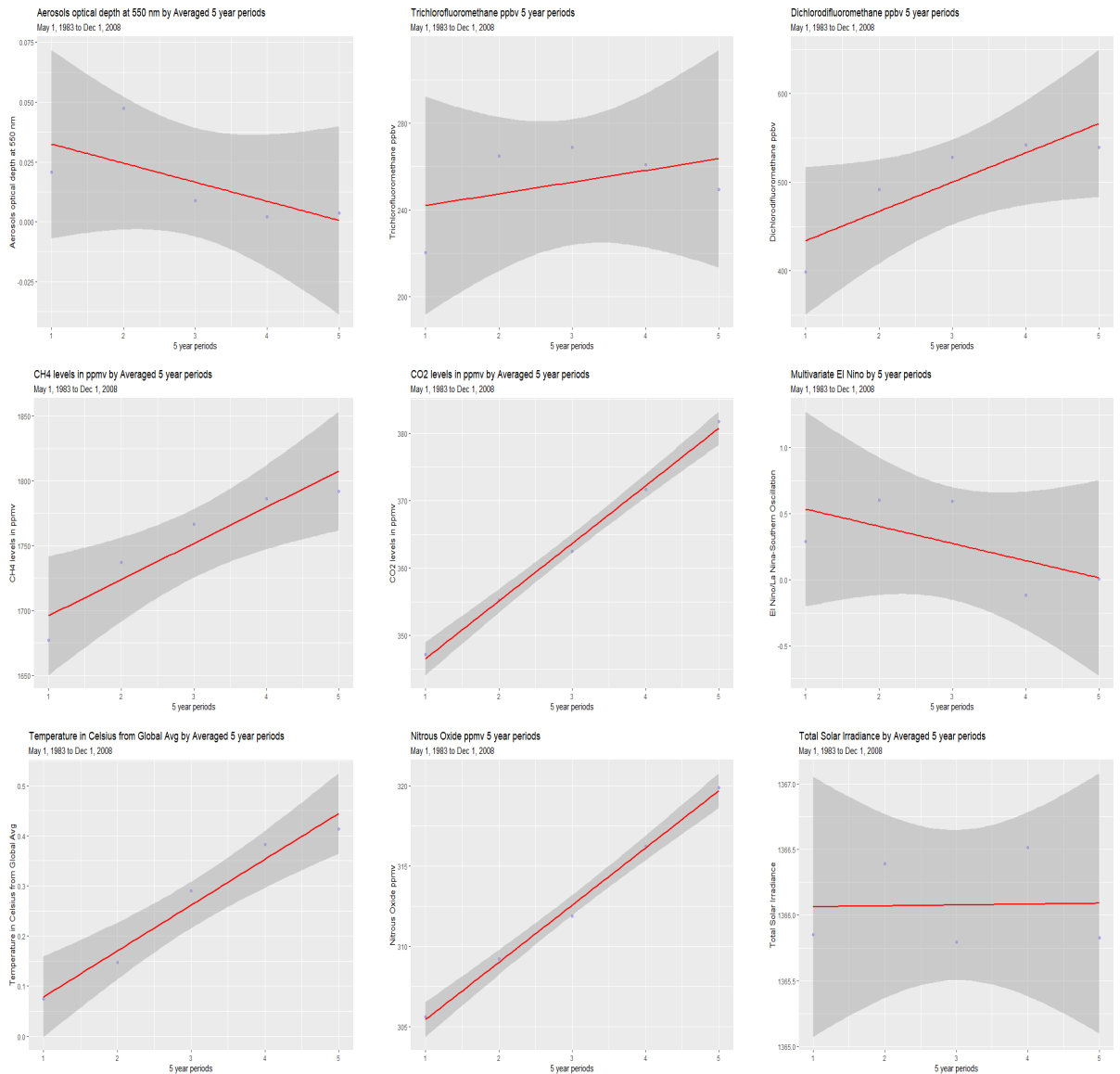
Because of seasonal variation (summer, winter, etc) several of these variables have obscured trends. It is obvious that dichlorodifluoromethane, Methane, Carbone Dioxide, and Nitrous Oxide are positively correlated to the increase of time.

## 2. Create a regression plot for all the graphs using the smooth function.



Using linear regression it is revealed that some less obvious variables are positively correlated to the passage of time. Including: Trichlorofluoromethan and temperature measured in celsius compared to global averages.

3. Plot the data over 5 year intervals eg. 1983 - 1987, 1988 - 1992, 1993 - 1997, 1998 - 2002, 2003 - 2008, averaging over the values over the period.



4. Create a Linear Regression Model for the different variables. Identify the following:

- (a) sample minimum (smallest observation),
- (b) lower quartile or first quartile (Q1),
- (c) median (the middle value),
- (d) upper quartile or third quartile (Q3),
- (e) sample maximum (largest observation).

MEI - El Nino/La Nina-Southern Oscillation

Minimum	Lower QRT	Median	Upper QRT	Maximum
-1.6350	-0.3987	0.2375	0.8305	3.0010

C02 - carbon dioxide

Minimum	Lower QRT	Median	Upper QRT	Maximum
340.2	353.0	361.7	373.5	388.5

CH4 - methane

Minimum	Lower QRT	Median	Upper QRT	Maximum
1630	1722	1764	1787	1814

N2O - nitrous oxide

Minimum	Lower QRT	Median	Upper QRT	Maximum
303.7	308.1	311.5	317.0	322.2

CFC 11 - trichlorofluoromethane

Minimum	Lower QRT	Median	Upper QRT	Maximum
191.3	246.3	258.3	267.0	271.5

CFC 12 - dichlorodifluoromethane

Minimum	Lower QRT	Median	Upper QRT	Maximum
350.1	472.4	528.4	540.5	543.8

TSI - total solar irradiance

Minimum	Lower QRT	Median	Upper QRT	Maximum
1365 1367	1366	1366	1366	1366

Aerosols - optical depth at 550 nm

Minimum	Lower QRT	Median	Upper QRT	Maximum
0.00160	0.00280	0.00575	0.01260	0.14940

Temperature in degrees Celsius from gobal average

Minimum	Lower QRT	Median	Upper QRT	Maximum
0.2820	0.1217	0.2480	0.4073	0.7390

## Exercise 2

In conclusion, the given data contains information about various atmospheric and climatic parameters, including MEI, CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CFC11, CFC12, TSI, and Aerosols. The data provides a summary of the minimum, first quartile, median, mean, third quartile, and maximum values for each parameter. The values show a wide range in the atmospheric concentrations of the different gases, with CO<sub>2</sub> having the highest median value at 361.7 ppm, and CFC12 having the highest maximum value at 543.8 ppt. The temperature data also shows a range, with a median value of 0.248°C and a maximum value of 0.739°C. These results provide a comprehensive overview of the state of the atmosphere and climate, highlighting the need for continued monitoring and efforts to mitigate the impacts of human activities on the environment.