Methodology

India

I obtained air data for each city in India for every day from 2015 to the present, including PM2.5, PM10, NO, NO2, NOx, NH3, CO, SO2, O3, Benzene, Toluene, Xylene, AQI and AQI_Bucket. These data can reflect the air conditions of a city from the side. Therefore, based on these data, I analyzed the air quality of India before and after the regional lockdown to analyze the impact of the regional lockdown policy on the air quality in India. First of all, I found that there may be a lot of incomplete data in the data. In addition, the data format of some data also needs to be changed. Therefore, according to the missing data of each indicator, I counted the proportion of missing data and made a heat map, so that I can choose the indicator with less missing data to analyze the air quality in India. In addition, I also counted which Indian cities are included in the data, and selected a few cities with poor air quality for typical analysis. In order to ensure the accuracy of the analysis, we also need to exclude other factors that affect the air quality data, so we also need to list the previous data in the form of a graph to see if the data distribution is stable. In order to ensure the accuracy of the analysis, we also need to exclude other factors that affect the air quality data, so we also need to list the previous data in the form of a graph to see if the data distribution is stable. After the preliminary preparations are made, we will use the time of lockdown as the standard to see the changes in air quality before and after.

California

I selected the air quality data in California for comparison, because the air quality in California is relatively good, I want to confirm whether the lockdown policy only has a positive effect on areas with poor air quality, or if it also affects areas with good air quality have a positive effect.

Result

In table 1, we find the Xylene miss a lot of data. Except that, other data are ok. So we choose to Combining the Benzene, Toluene and Xylene levels into one column BTX. Totally, the data can be used to judge the change of air pollution in India.
In table 2, PM2.5 and PM10 pollution show a seasonal effect, with pollution being higher in winter months as compared to the summer ones.SO2 level has started increasing after 2017, although it had also seen a sudden rise in 2015 also. The same pattern is also reflected in BTX levels also.
In table 3, The black vertical line shows the date on which the first phase of lockdown ame

into effect in India. The graph shows the variation of various pollutant levels, from Jan 2019 onwards till date. Apparently, all the above Indian cities seem to be a dangerously high level of pollution levels. Clearly, there appears to be a rapid decline after 25th March,2020 in all the cities under lockdown.

In table 4, The black vertical line shows the date on which the first phase of lockdown ame into effect in California. The above graph shows the variation of various pollutant levels, from Jan 2019 onwards till date. Apparently, all the above Indian cities seem to be a high level of pollution levels. Clearly, there appears to be a rapid decline after 19th March,2020 in all the cities under lockdown.

Through the comparison of 3 and 4, it is not difficult to see that the lockdown policy has a very positive impact on air pollution in both India and California. The AQI levels have a significant drop after the lockdown policy been post.

	Missing Values	% of Total Values
Xylene	18109	61.300000
PM10	11140	37.700000
NH3	10328	35.000000
Toluene	8041	27.200000
Benzene	5623	19.000000
AQI	4681	15.900000
AQI_Bucket	4681	15.900000
PM2.5	4598	15.600000
NOx	4185	14.200000
O3	4022	13.600000
SO2	3854	13.100000
NO2	3585	12.100000
NO	3582	12.100000
CO	2059	7.000000

Table 1. Missing data in India

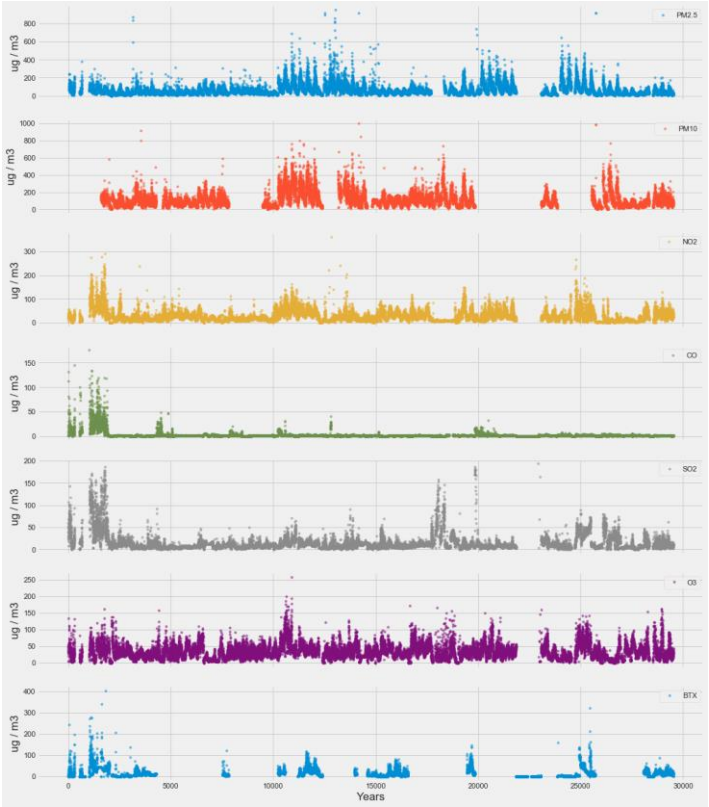

Table 2. India Air Pollution Distribution

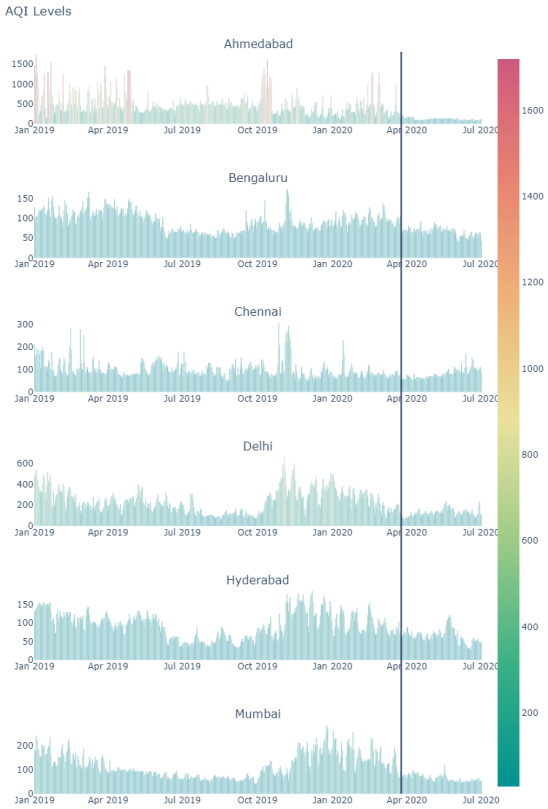

Table 3. India lockdown image

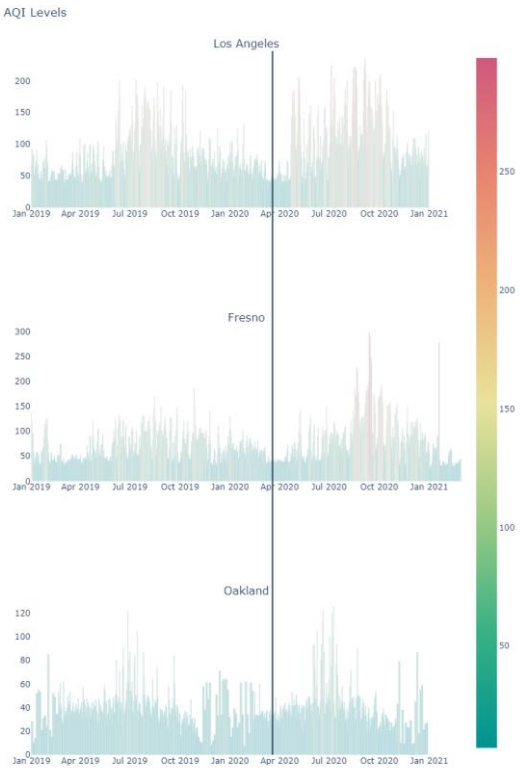

Table 4. California lockdown image