Gil Baram, Yannick Kircher, Jenny Hilgenberg

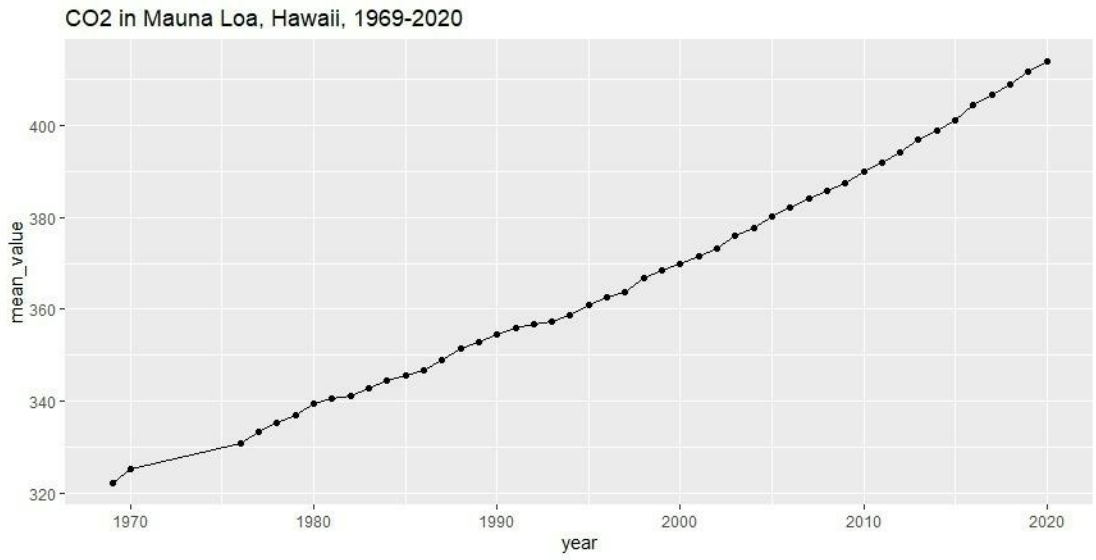
Uebung 2 in Geosensornetzwerke

Aufgabe 1

a.

- The type of all columns is ‘character’ and they were needed to be converted, unlike the other datasets in A2
- The measures of years 1971-1975 are missing.

	Site	Year	Month	Value	dates
14	MLO	1970	8	324.91	1970-08-01
15	MLO	1970	9	322.98	1970-09-01
16	MLO	1970	10	322.65	1970-10-01
17	MLO	1970	11	324.05	1970-11-01
18	MLO	1970	12	325.55	1970-12-01
19	MLO	1976	7	332.29	1976-07-01
20	MLO	1976	8	331.04	1976-08-01
21	MLO	1976	9	329.67	1976-09-01
22	MLO	1976	10	329.33	1976-10-01
23	MLO	1976	11	330.47	1976-11-01
24	MLO	1976	12	331.97	1976-12-01



b. The compound annual growth for the years:

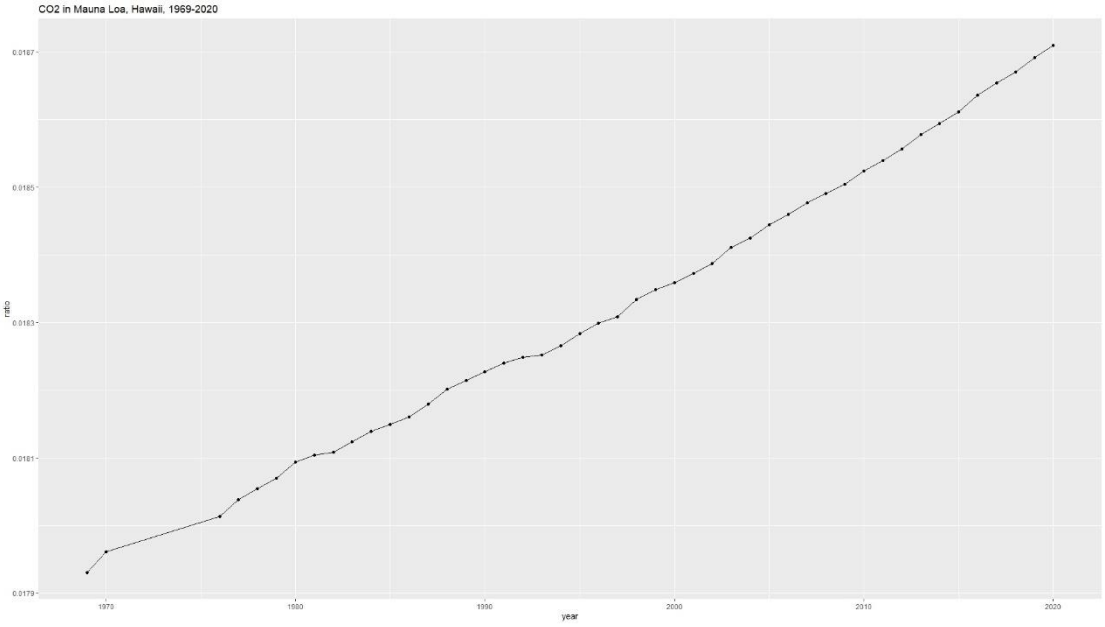
- 1980 – 1989: 0.39%
- 2000 – 2009: 0.47%
- 2010 – 2019: 0.54%

The compound annual growth increased along the years.

c. The trend in not growing exponential; We made the quotienting test by using the formula:

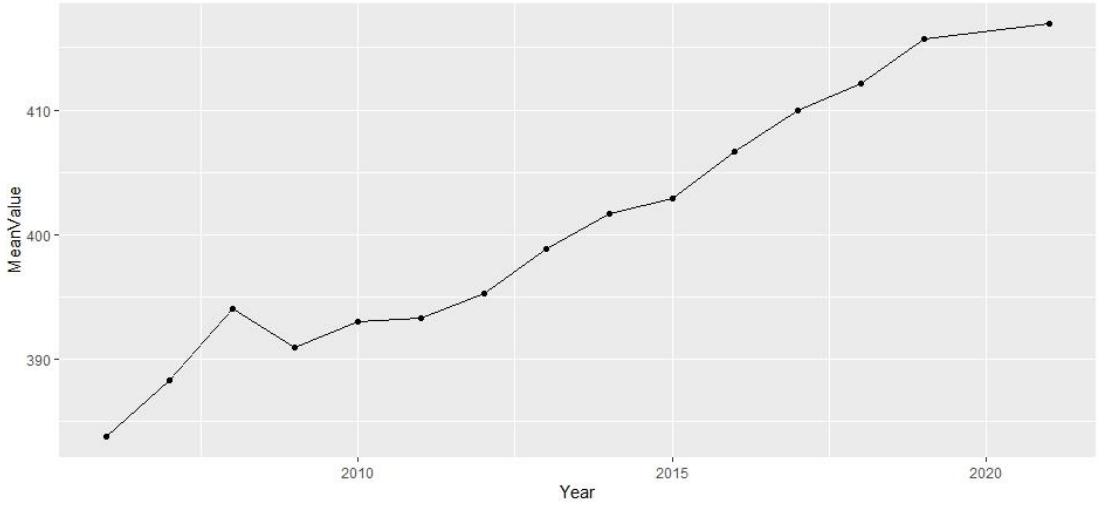
$$\log mean_t \ - \log mean_{t=1969} \ \ \forall t \in [1969,2020]$$

However, we didn't notice any significant change from the normal values.

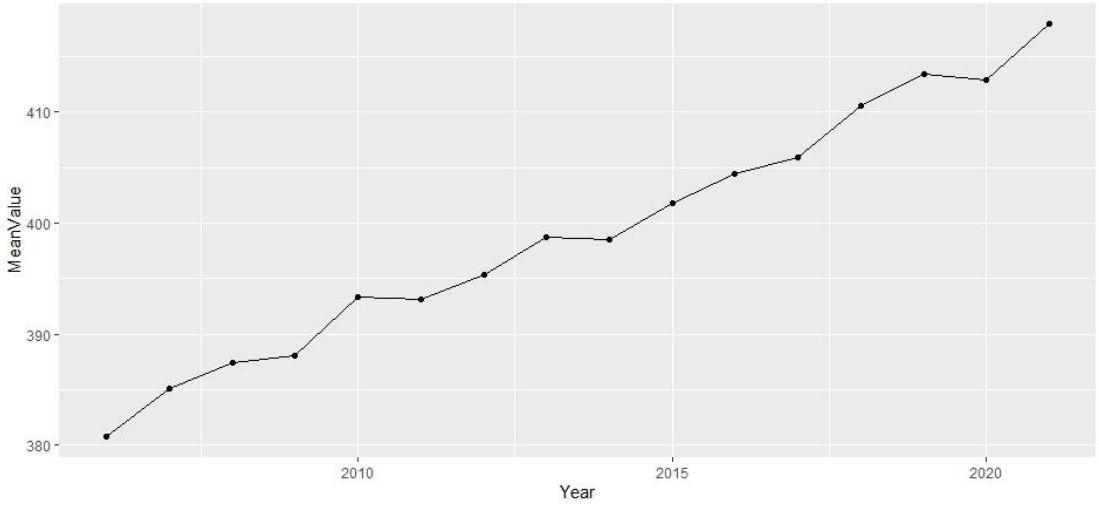


Aufgabe 2

d. CO2 Mean Values in Ochsenkopf, Germany



CO2 Mean Values in Hohenpeißenberg, Germany



Ochsenkopf & Hohenpeißenberg mean values

	Year	MeanValue
1	2006	380.7367
2	2007	385.0850
3	2008	387.3892
4	2009	388.0892
5	2010	393.3817
6	2011	393.1792
7	2012	395.3242
8	2013	398.7450
9	2014	398.5608
10	2015	401.7708
11	2016	404.4008
12	2017	405.9350
13	2018	410.5400
14	2019	413.4525
15	2020	412.9158
16	2021	417.8983

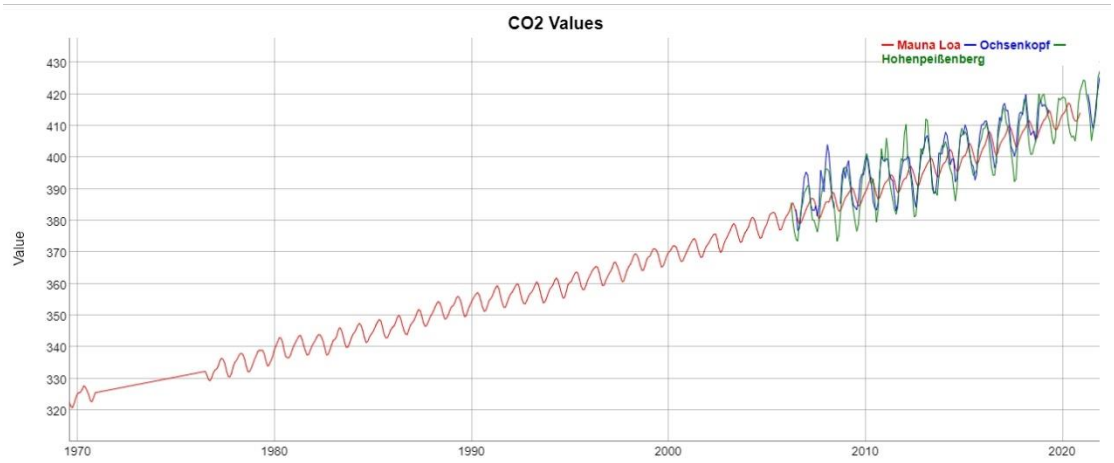
	Year	MeanValue
1	2006	383.7700
2	2007	388.2958
3	2008	394.0522
4	2009	390.9858
5	2010	393.0575
6	2011	393.3375
7	2012	395.2708
8	2013	398.8225
9	2014	401.6758
10	2015	402.9333
11	2016	406.6700
12	2017	409.9508
13	2018	412.1042
14	2019	415.7060
15	2021	416.8888

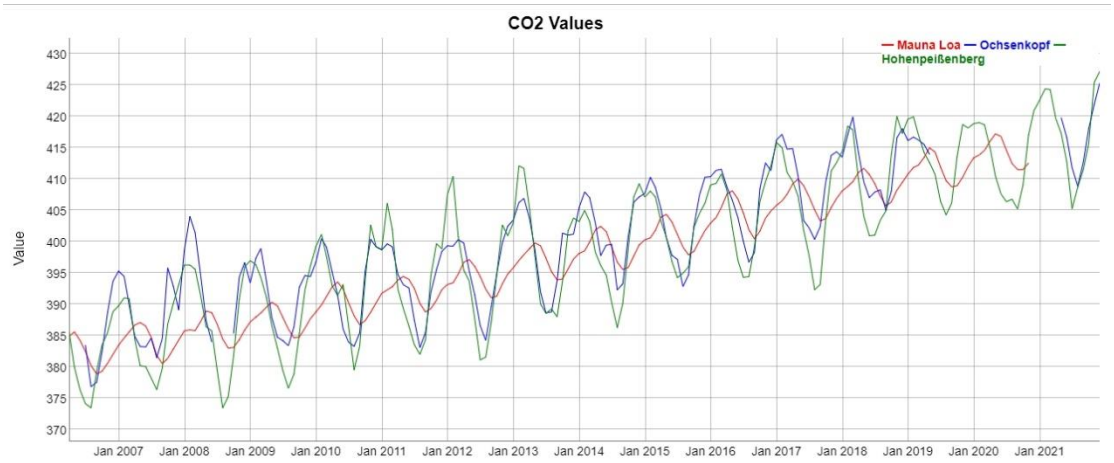
e. We can notice that the measures from 2020 from Hohenpeißenberg are missing. The compound annual growth for the years 2010-2019:

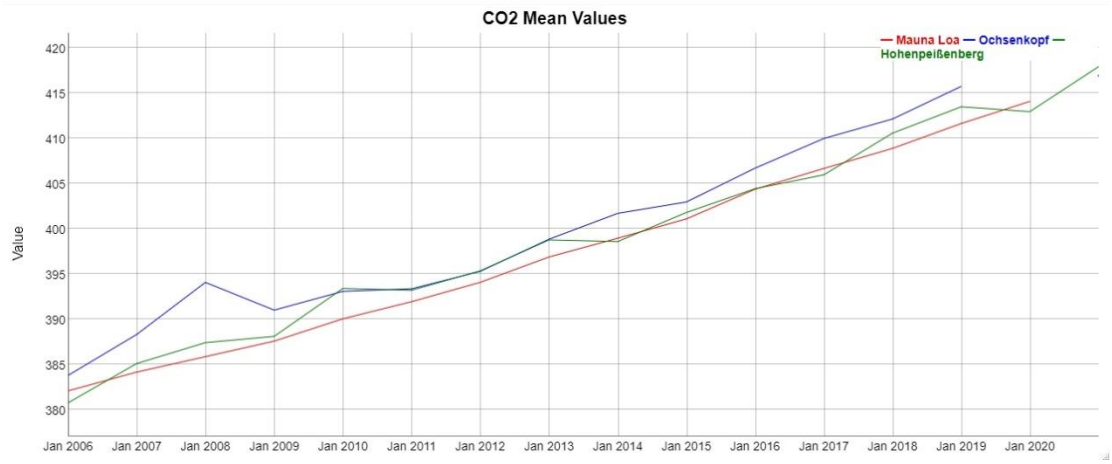
- Ochsenkopf: 0.61%
- Hohenpeißenberg: 0.63%

Those values are significantly higher than the measures in Mauna Loa.

f. Comparing between the 3 stations:







The measures in all 3 stations are approximately constant, especially in Mauna Loa. In February 2008 the emission in Ochsenkopf was higher than February 2007 by 1.024%. The time of the year with high emission is in Winter, the low in Summer. This is not the case with the station in Mauna Loa. There the highest emission is in May and lowest in September every year. The sensor in Hawaii has less volatility than the two in Germany.

Aufgabe 3

	hour	sample1	eight_hours_Oz_S1	sample2	eight_hours_Oz_S2
1	0	0.060	0.067	0.060	0.064
2	100	0.063	0.069	0.061	0.065
3	200	0.063	0.071	0.064	0.066
4	300	0.066	0.072	0.064	0.067
5	400	0.068	0.074	0.064	0.068
6	500	0.071	0.075	0.066	0.068
7	600	0.072	0.076	0.067	0.069
8	700	0.073	0.077	0.069	0.070
9	800	0.074	0.078	0.068	0.069
10	900	0.078	0.078	0.069	0.070
11	1000	0.078	0.079	0.068	0.070
12	1100	0.077	0.078	0.070	0.070
13	1200	0.079	0.078	0.070	0.070
14	1300	0.079	0.078	0.070	0.069
15	1400	0.080	0.076	0.072	0.068
16	1500	0.078	0.075	0.068	0.068
17	1600	0.079	0.074	0.071	0.067
18	1700	0.080	0.072	0.070	0.066
19	1800	0.076	0.071	0.068	0.066
20	1900	0.075	0.070	0.068	0.065
21	2000	0.073	0.069	0.065	0.065
22	2100	0.071	0.068	0.065	0.065
23	2200	0.070	0.067	0.065	0.065
24	2300	0.067	0.066	0.065	0.064
25	2400	0.065	0.065	0.064	0.064