

# meteoLCD Weblog

A weblog on climate, global change and climate measurements

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## AQI: air quality confusion (2)



This is part 2. Click on the links below for the other parts.

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In the first part I finished with the definition of the US EPA AQI, with 6 quality levels and AQI numbers of to 500. Before going to Europe, let us begin this part with the Chinese AQI.

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### 5. The PRC Chinese AQI

China uses for defining air quality the same 6 pollutants as does the US EPA (see [here](#)): O3, NO2, PM10 and PM2.5, CO and SO2. It also uses 6 quality levels albeit with different wording: EXCELLENT to SEVERELY POLLUTED. The Chinese sub-AQI's (called IAQI = individual AQI) run from 0 to 500, as do the EPA sub-AQI's. And the highest IAQI defines the published AQI. Most of the times PM2.5 is the primary pollutant with the highest IAQI, but during summer time O3 may have the highest IAQI.

The break-points for PM's differ from those of EPA ([link](#), attention: this blog has a completely wrong table comparing US and China other AQI's):

AQI Score	Description	PM10 (US) $\mu\text{g}/\text{m}^3$ 24 hr	PM10 (CHINA) $\mu\text{g}/\text{m}^3$ 24 hr	PM2.5 (US) $\mu\text{g}/\text{m}^3$ 24 hr	PM2.5 (CHINA) $\mu\text{g}/\text{m}^3$ 24 hr
0-50	Excellent	0	0	0	0
51-100	Good	50	50	15	35
101-150	Slightly Polluted	150	150	40	75
151-200	Lightly Polluted	250	250	65	115
201-300	Moderately Polluted	350	350	150	150
>300	Heavily Polluted	420	420	250	250

Table 1. US and China AQI breakpoints for PM10 and PM2.5. Note: the Descriptions in column 2 are based on the Chinese AQI standards, not the US's.

The qualifiers ("Description") in this table are the Chinese ones, and obviously China is much more tolerant for PM2.5 as is the EPA (notice that the first Chinese break-points are considerably higher). The same remark holds for some of the other pollutants as shown in this comparison table which uses 1996 EPA break-points ([link](#)):

AQI (China)	AQI (USA)	China & USA AQI	Pollutant Concentrations ( $\mu\text{g}/\text{m}^3$ )							
			SO <sub>2</sub> (24h Average)	NO <sub>2</sub> (24h Average)	CO (24h Average)	O <sub>3</sub> (1h)	O <sub>3</sub> (8h Average)	PM10 (24h Average)	PM2.5 (24h Average)	
Excellent	Good	0-50	50	80	4	12	100	150	50	35
Good	Moderate	51-100	150	370	8	11	200	300	150	75
Lightly Polluted	Unhealthy For Sensitive Groups	101-150	475	587	14	14	300	325	250	115
Moderately Polluted	Unhealthy	151-200	800	797	24	18	400	400	350	150
Heavily Polluted	Very Unhealthy	201-300	1600	1303	50	25	800	702	700	420
Severely Polluted	Hazardous	301-500	2620	2631	160	38	1200	1104	1000	500

First one should note that China uses  $\mu\text{g}/\text{m}^3$  as concentration unit. Second it calculates NO2 pollution only using a 24h average, whereas EPA uses 1h values, which makes comparison impossible. Third where comparison can be made, the break-point numbers are very close for O3, CO and PM10 but differ for SO2 (24h), NO2 (24h) and PM2.5 (24h).

Chinese AQI's are often calculated as the average from readings of multiple stations around a city, whereas US EPA AQI's always come from a single station.

The US Embassies in China have their own measuring stations which use the EPA standard: see [here](#).

There are a couple of smartphone apps to visualize real-time Chinese AQI's, but I did not find an official Chinese live map on the web based on Chinese AQI standards. The [waqi.info](#) web site shows Chinese air quality using EPA standards; the same holds for the website [aqicn.org](#).

The next picture shows the situation today 21 May 2018 at 14:10 UTC:

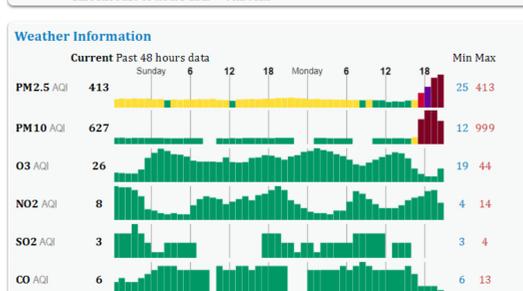


Clicking on a label gives more information, as for instance for the City of Yulin:

**Century Plaza, Yulin AQI:** Century Plaza, Yulin Real-time Air Qual

**627** **Hazardous**  
Updated on Monday 21:00  
Primary pollutant: **pm10**

Current Past 48 hours data Min Max



We see that PM2.5 and PM10 situation is particularly bad, whereas O3 and NO2 levels are GOOD.

Comparing AQI's over China with those of other parts of the world clearly shows that bad air quality (mostly PM's) is a serious issue in many parts of mainland China.

### Conclusion:

Be careful when reading AQI's for China, as often it is not clear on what standard they are based. The following paragraph ([link](#)) summarizes this well:

#### Summary: Discrepancies Between AQI Readings

So there are many reasons comparing the US embassy/consulates AQI to the official China AQI, or comparing one mobile app's AQI to another is like comparing apples to oranges. This is not due to false data reporting, but rather due to different standards and reporting methods. Questions to ask include:

[Chinese and US AQI](#)

- Is this AQI value based on the US or China standard?
- Is this AQI value derived from the PM2.5 concentration or another pollutant's concentration?
- Is this AQI value derived from a real-time measurement or a 24-hour average?
- Is this AQI value derived from a single test site (if so which one), or an average of results from several monitoring stations?

(go to part 3)

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