

## Passage 2 - Research summary on substances in the atmosphere (earth science)

### Overall:

-wet deposition: substances in the atmosphere that are transferred to the Earth's surface by precipitation

-Cu and Zn from high temp combustion process (like a car)

-Cl in atmosphere from road salt dust

-SO<sub>4</sub> from electrical power generation

**(Note the word "respectively")**

-There are details about how each of the substances are generated. Some question may be about electrical power generation or road salt dust or combustion without stating a specific substance, and you will have to make the connection on your own to the substance.

### Study 1:

-monthly rainfall measured at a 'specific urban site' each day, then added together for monthly totals.

-rainfall stored for testing

Figure 1 shows that

-the range of rainfall per month is from 2cm (July) to 18cm (Feb)

-there are clearly rainy (Jan - June) and not so rainy months (July - December)

Figure 2 show that

**- the y-axis scale is different for Cu (0-150) than for Zn (0-800)**

-Cu is relatively constant around 50 ug/m<sup>2</sup> for all months, except high 140 (June) and low 25 (October)

-Zn trends downward throughout the calendar year, from a high of 700 (Jan) to low ~100 (Oct, Nov, Dec)

### Study 2:

-Figure 3 has a different unit of measure (meq/m<sup>2</sup>) than does Fig 2 (ug/m<sup>2</sup>).

-Again, **the y-axes for Cl and SO<sub>4</sub> have different scales**, 0 - 2.0 and 0 - 10, respectively.

-Cl is around 1 Jan-April, then low (<0.5) May-Oct, then spikes to 1.5 in November.

**-SO<sub>4</sub> is the only one of the four substances that exactly matches the pattern of rainfall levels in Figure 1**

### Study 3:

-annual amount ('wet deposition') for Cu and Zn in SAME urban environment (from previous studies) and at two NEW sites, Rural Site 1 (50km east) and Rural Site 2 (100km east)

-the y-axis has a slanted double line in it, which indicates that some values in the y-axis were removed (see Note below)

-Zn levels are about 5-8 times higher than Cu levels

-for both Cu and Zn, the amounts decrease as distance from the urban site increase

**Notes:**

-Always check the y-axes when multiple figures are provided. Often the scales (the numbers) will be different, so if you just glance at the lines without looking at the scales, you will make invalid comparisons.

-When an axis has a slanted double line through it (as in Figure 4), this indicates a change in scale. Notice that, under the double line, the y-axis increases by 200s and, above the double line, the y-axis increases by 1000s.

-In this type of passage, since the introduction makes clear that the substances are somehow related to rainfall (we are measuring their 'wet deposition', after all), keep the following question in mind when reading each of the figures: "Do these lines for wet deposition (Figures 2 and 3) match with the bars for monthly precipitation (Figure 1)?" And the answer is, "Only SO<sub>4</sub>."