The important boundaries (the lines) separating phases have some universally used abbreviations:

- **A**: The upper limit of the ferrite / cementite phase field (horizontal line going through the eutectoid point).
- **A**: The temperature where iron loses its magnetism (so-called Curie temperature). Note that for pure iron this is still in the $\alpha$-phase.
- **A**: The boundary between the $\gamma$ austenite and the austenite/ ferrite field.
- **A**: The point in this case where $\alpha$ changes to $\delta$ at high temperatures.
- **A**: The boundary between the $\gamma$ austenite and the austenite / cementite field.

Why would anybody abbreviate a temperature with the letter "A"? Well, it stands for "arrest", something that happens in the slope of dilatometric or thermal curves recorded whenever phase diagrams where first measured. Statements like "the addition of x lowers A" are now clear.

The circular insets give a schematic idea of what the structure would like at the compositions and temperatures indicated.

The next thing to know is that the phase diagrams above is actually not the true iron-carbon phase diagram. I lied to you. Some mixture of cementite and iron is not the configuration that allows the system to achieve total nirvana. That would be a iron - graphite mixture.

All the cementite forming is just a transient phase on the way to nirvana; it will decay into pure carbon (graphite) and iron in due time. Due time, however, means millennia and more at room temperature for plain carbon steel. Cementite, in other words, is a very long-lived metastable phase under normal conditions. It thus makes sense to use it for something that is not a true phase diagram for purists, but that sane normal folks will call "phase diagram" anyway.

We are also justified in doing this because the "real" iron - graphite phase diagram looks almost exactly like the iron - cementite "phase diagram". Here is the proof:
Does that mean that we don't have to worry about graphite being formed? Yes and no. Like almost always, it depends:

- For **plain carbon** steel with carbon concentrations below 2%, you needn't worry, indeed. Graphite is *never* formed and the usual phase diagram covers everything nicely.
- For **cast-iron**, with carbon concentrations up to a few percent you need to worry. Graphite might form, depending on conditions.
- For **alloy steel**, the usual thing nowadays, you need to worry, too. Some alloying elements, in particular silicon (Si) but also nickel (Ni), promote graphite formation.