

Skeleton plotting

Before you start:

A) Make sure that your sample is properly mounted and sanded. Can you see each cell clearly? Rings can be very tiny - a growth layer of just one, pale cell as narrow as 0.01 mm.

- Sometimes a core slides while you glue it onto the wooden lath. Make sure that the fibres still point straight up, so that there is a 90° angle between fibres and the sanded surface. You can check this at the inner end of the core, or where the core is broken in pieces. Also, when properly aligned, the sides of the core will reflect light ("shiny sides"). When the core is twisted for natural reasons (spiral grain), you can break it into two or more pieces which then can be aligned individually (but keep the bits in the correct order).
- After sanding, the surface should shine if you hold it up against the light. If not, give it another round with fine sandpaper. If there are deep scratches, go back to coarser sandpaper and repeat the last sanding steps.

B) Have you marked each 10th ring on the sample with a pencil?

- If you don't know the age of the wood, start counting at the pith and move towards the bark.
- If you already know the year of the outermost ring (e.g., 2011), mark the ring of 2010 and count inwards. Remember, three dots for the centuries (e.g., 2000) and two dots for half centuries (e.g., 1950).
- Important: Place the dots in the earlywood (the light part of the ring).
- If you have made a mistake, carefully remove the dot with an eraser.

C) This is what you need:

- microscope,
- pencil, eraser, ruler, grid paper (see last page),
- if old trees: scissors, tape/glue

Drawing a skeleton plot

A skeleton plot is drawn on grid paper.

A) The time axis:

- The time axis (x-axis) spans from the first to the last ring on your sample, one grid per year.
- Draw this line horizontally in the middle of the plot (y-axis zero).
- Use the bold vertical lines in the grid for the decades (2000, 1990 etc.; if the sample is undated: rings 10, 20 etc.).
- Place the innermost ring on the left hand side, and the outermost ring (e.g., 2011) at the right hand side of the plot.
- Use the symbols for the innermost and outermost ring as shown below.
- In case that your tree is older than the number of grid boxes on the paper, use several strips of paper and glue them together.

Symbols for the outermost ring are:

- ↙ sample ends with earlywood (light wood, square thin-walled cells)
- ↘ sample ends with latewood (dark wood, flattened thick-walled cells)
- †† dead trees

Symbols for the innermost ring are:

- pith present on sample,
- the innermost ring on the sample is close to the pith (if you don't hit the pith with the corer),
- × the innermost ring is far from the pith (impossible to estimate the number of rings missing).

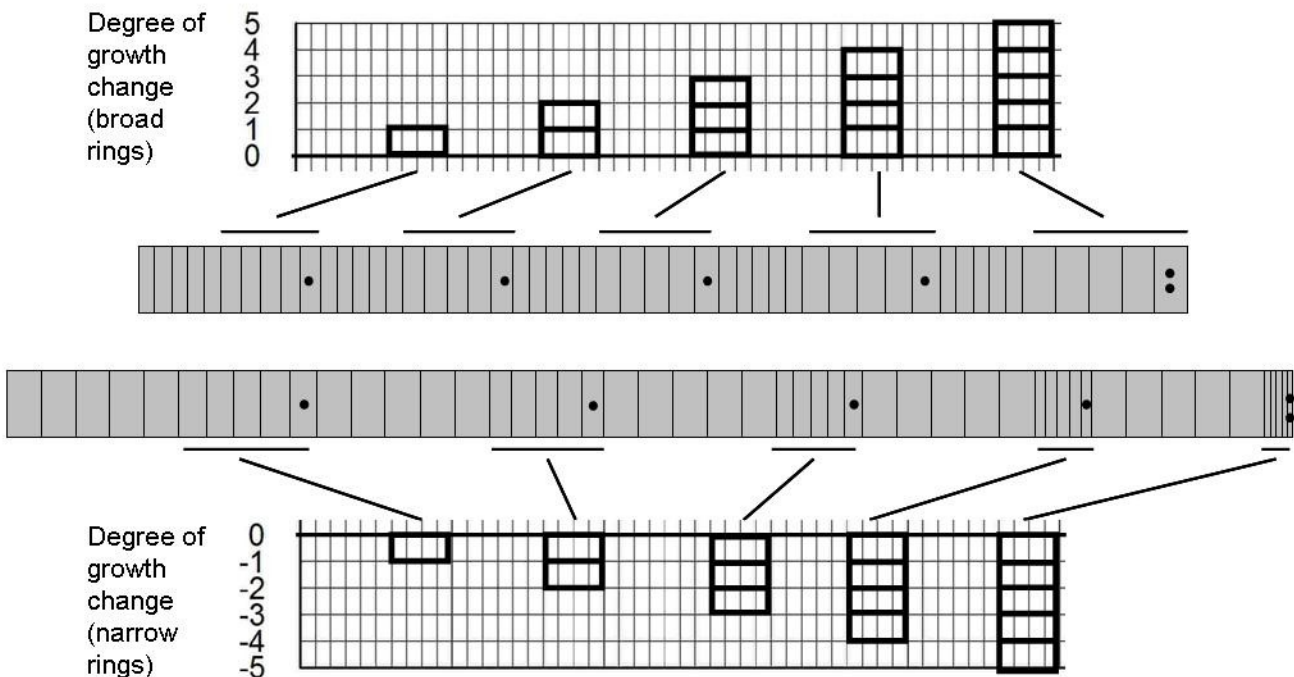
B) Sudden changes in growth rates:

Study the tree-rings starting from the pith and towards the bark, and look for years when the tree significantly changes its growth rate. This means that the rings suddenly get broader (abrupt growth release) or narrower (abrupt growth reduction).

- Draw these as boxes (see the figure below).
- Boxes for growth releases point upwards, boxes for growth reductions point downwards.

Generally, tree growth shows a biological age trend starting with broad rings in the centre and gradually narrower rings when trees become older. If this change in growth is smooth, we don't record it in the skeleton plot. We do, however, want to record sudden changes due to, for instance, damages to the tree (growth reduction) or the death of a neighbouring tree (growth release).

Growth periods (growth reductions and releases)



C) Single years:

Once more, study the rings from the pith towards the bark, this time looking for single rings that differ significantly from the previous ones.

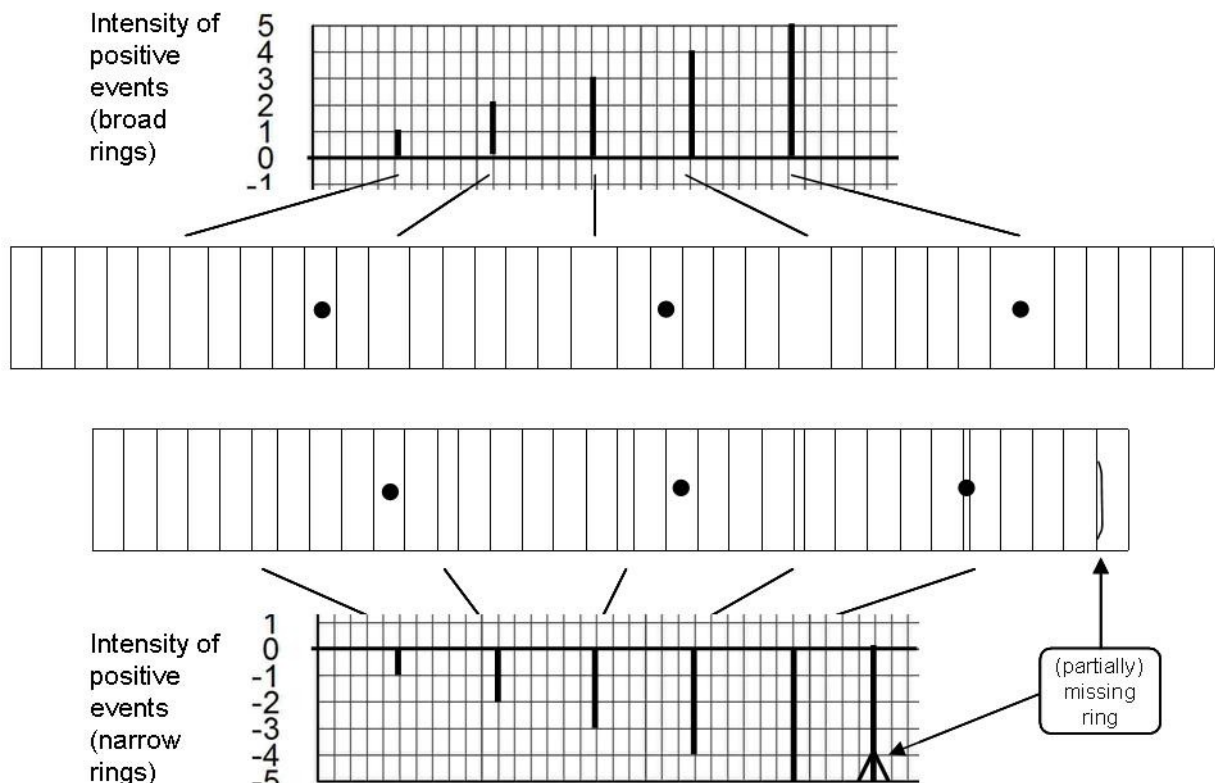
- Single years (also called events) are marked as lines. See figure below.
- Lines for broad rings point upwards, lines for narrow rings point downwards.
- You can also draw events within a growth period.
- Groups of up to three broad (narrow) rings can be marked as single years. But if there are four or more broad (narrow) rings in a row, these are defined as a period (drawn as boxes).

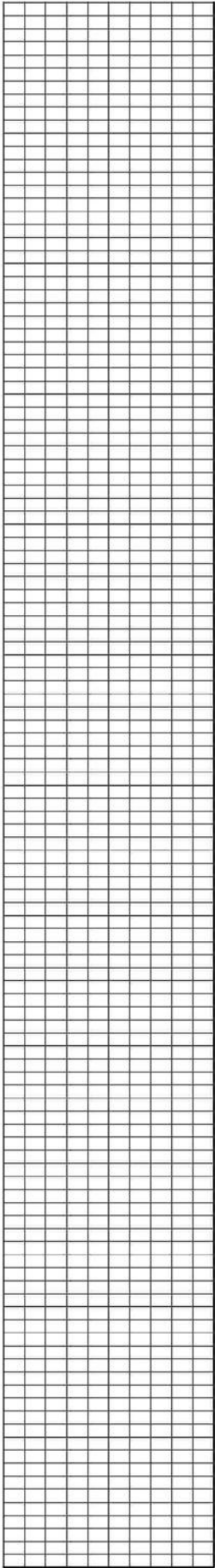
The width of each ring is subjectively rated in relation to the mean width of the previous about 5 rings. Thus, it is not important how broad the ring of 2011 is compared to the ring of 1900. And we don't want to draw a line for each ring. Rather, we want to find the years in which the tree reacted to unusual events, such as cold (narrow rings in subarctic/subalpine climates) or dry summers (narrow rings in Mediterranean climate).

As a rough scale for growth events and changes you can use, from weakest to strongest:

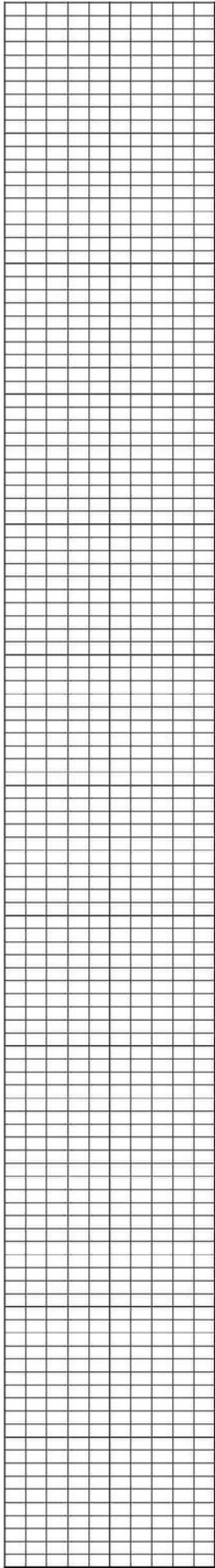
1. >20 %,
2. >33 %,
3. >50 %,
4. >67 %, and
5. > -80 % (tiny rings) and > +100 % (doubling of ring width).

Single years (events)

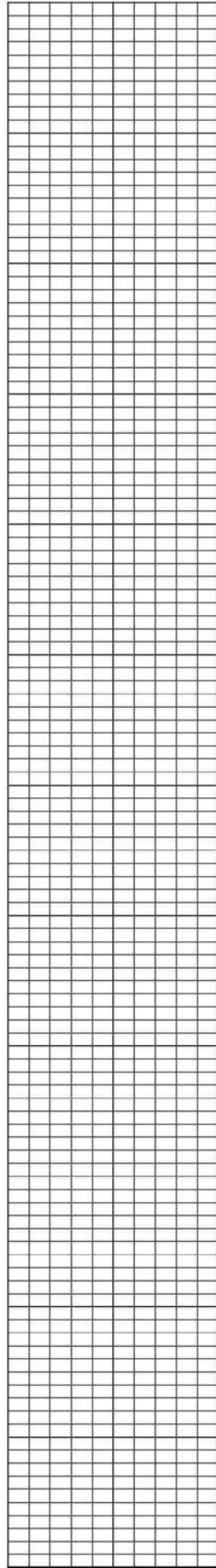




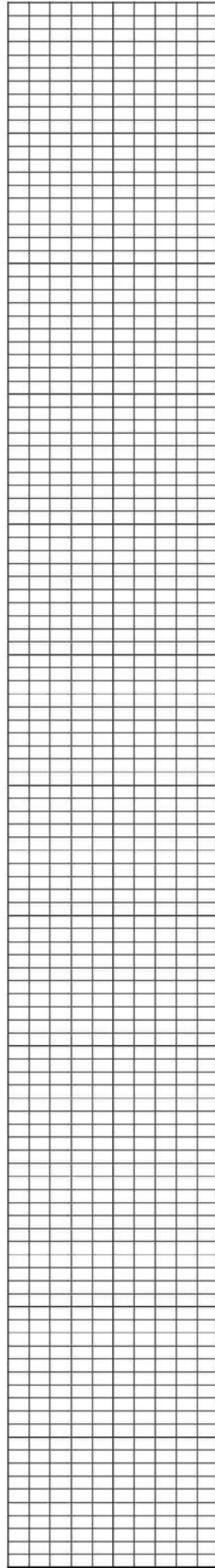
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