What is the quantitative nature of the relationship between time and cells features?

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**Introduction**

Xylogenesis: the main actor of forest productivity

\[ \sum_{i} f(x) \]

It is function of:

- lignification
- enlargement

Timing of:

- lignification, maturation
- enlargement

Deslauriers et al. 2003

Rossi et al., 2006 ; Rossi et al, 2009

**Methodology**

**Timings & durations**

weekend or fortnightly

for 15 years (only 5 in MIR)

Number of cells in

Maturation - lignification - enlargement

Deslauriers et al. 2003

Rossi et al, 2006 ; Rossi et al, 2009

**GAMs application**

Timing of:

- enlargement, lignification, maturation

Duration of:

- enlargement, lignification

for each percentile cell position

Deslauriers et al., 2014; Balducci et al., 2016

Application of modified VB equation

\[ y = cell \text{ parameters} \]

\[ x = duration \text{ of the developmental phases} \]

\[ x = duration \text{ of the developmental phases} \]

**THE HYPOTHESIS**

\[ = A (1 - e^{-K(x-B)}) \]

<table>
<thead>
<tr>
<th>Site</th>
<th>A</th>
<th>K</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM</td>
<td>33.83</td>
<td>1.09</td>
<td>1.10 ±0.47</td>
</tr>
<tr>
<td>BER</td>
<td>35.79</td>
<td>3.16</td>
<td>1.81 ±0.59</td>
</tr>
<tr>
<td>MIS</td>
<td>34.38</td>
<td>2.58</td>
<td>1.10 ±0.64</td>
</tr>
<tr>
<td>DAN</td>
<td>34.00</td>
<td>2.80</td>
<td>1.63 ±0.56</td>
</tr>
<tr>
<td>MIR</td>
<td>32.00</td>
<td>1.58</td>
<td>1.00 ±0.35</td>
</tr>
</tbody>
</table>

**Discussion**

**Horizontal pattern**

Pattern similar to the vertical one

Carrer et al., 2014

**Vertical pattern**

Sugar models and variations in density linked to increasing negative pressures can explain the limits in cell wall thickness deposition

Deslauriers et al. 2016

Hacke et al. 2001