Changes in C distribution before/after fire disturbance

estimated C loss = 37.3 MgC ha\(^{-1}\)

unit: MgC ha\(^{-1}\)
CO₂ emission through fire and decomposition processes of burnt organic matters

1. Duff decomposition
- Combustion: 21.4tC/ha
- Decomposition: 2.5tC/ha/y

2. CWD decomposition
- Decomposition: 0.1tC/ha/y

Dramatically Increasing now...
C storage in plants

\[ C = f(\text{Active layer depth}) \]

Black spruce forests in discontinuous permafrost region of Caribou Poker Creek, Interior Alaska.

**Picea mariana**

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**Average Max. (at N0)**

- \( D_{1.3} \): 8.5 cm
- \( H \): 9.3 m
- \( w \): 32.1 kg

**Average Min. (at N6)**

- \( D_{1.3} \): 2.8 cm
- \( H \): 2.7 m
- \( w \): 3.1 kg
Moss-lichen community succession after fire disturbance

- **Ceratodon purpureus**
- **Polytricum commune**
- Lichen
- **Sphagnum moss**
- Feathermoss
  - \(\text{Hylocomium splendens} \)
  - \(\text{Pleurozium schreberi}\)
Stem length of the moss in each year in recent five years.
Comparison for NPP components among sites (litterfall, ground flora, fine root)  unit: g m\(^{-2}\) yr\(^{-1}\)

<table>
<thead>
<tr>
<th>NPP component</th>
<th>5-year</th>
<th>10-year</th>
<th>90-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Litterfall</td>
<td>20.5 (18)</td>
<td>21.8 (21)</td>
<td>30.3 (23)</td>
</tr>
<tr>
<td>2. Ground flora</td>
<td>46.4 (40)</td>
<td>33.3 (33)</td>
<td>37.7 (28)</td>
</tr>
<tr>
<td>3. Fine root</td>
<td>48.0 (42)</td>
<td>47.0 (46)</td>
<td>64.5 (49)</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>102</td>
<td>133</td>
</tr>
</tbody>
</table>

Bleu figures: % of total

Larger contribution of fine root to NPP components in all sites.