Fire History in the Strait of Georgia Lowlands

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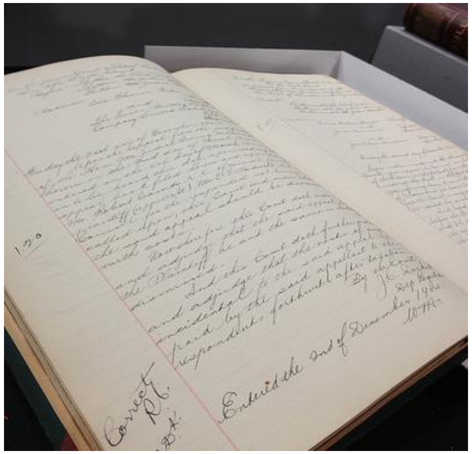
Key Points

- **Fire suppression** = wildfire damage & hinders natural processes
- **Prescribed fire** to reduce fuel loads & restore vegetation
- Effective fire-based, ecological restoration requires **fire history**
  - Mean Fire Return Interval (MFRI)
- **Straight of Georgia lowlands → 330 yr MFRI**
- MFRI influenced by:
  - Temporal scale
  - Methodology
  - Local site factors

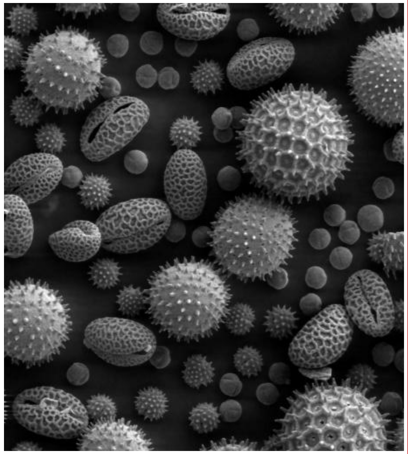
What is Fire History? Why is it Useful?

- **Describes variability of fire disturbances over time**
  - MFRI = average number of years between fires

1. Restoration direction & baselines
2. Role of humans & climate in shaping fire regimes
3. Public awareness to reduce resistance to active management



Short timescales



Long timescales

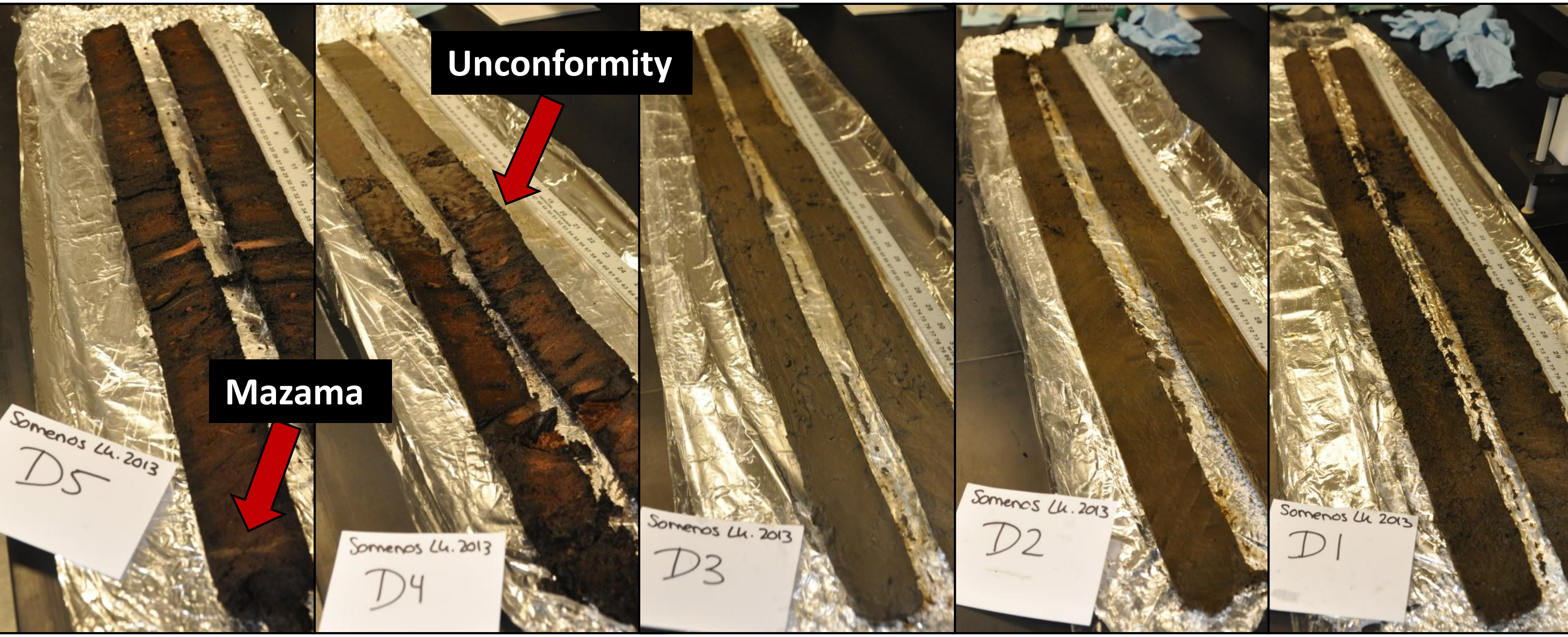
Why is this Study Area Interesting?

- **Ecoprovince**
  - Highly populated
  - Biodiverse
  - Ecosystem degradation
- **Fire history informs restoration**
  - Somenos Lake

History of Somenos Lake

Depth

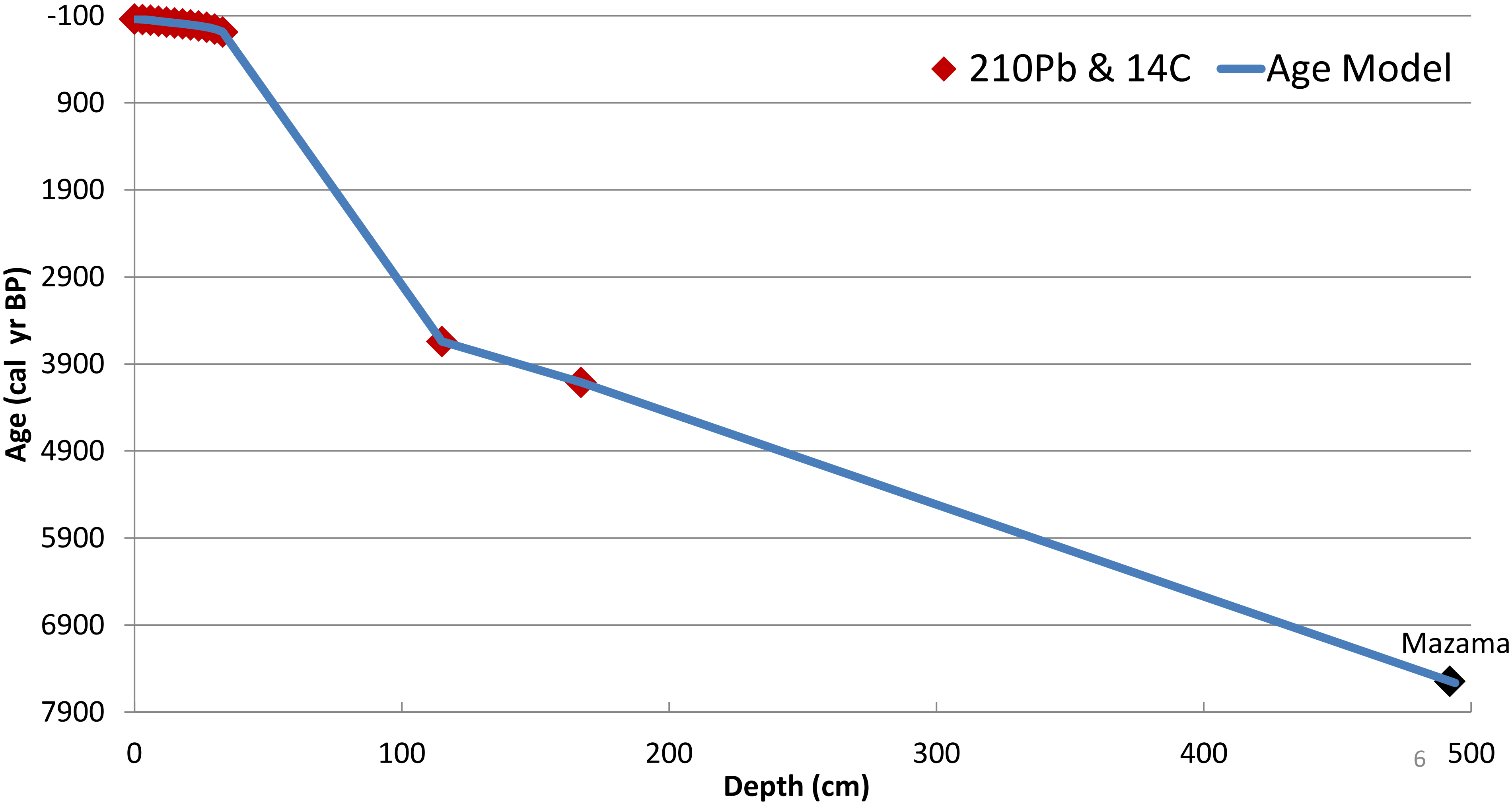
495 cm → 0 cm



Core 5 Core 4 Core 3 Core 2 Core 1

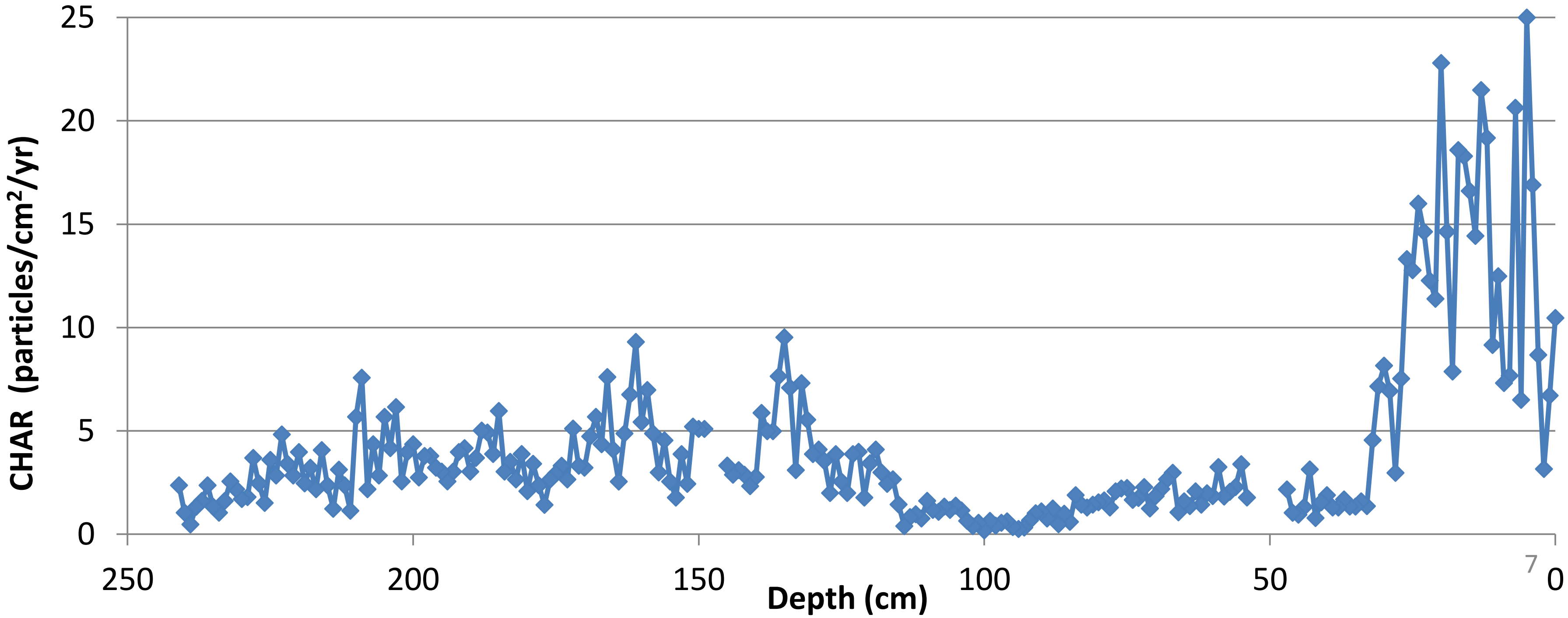
Dating the Core

- Age-depth model constructed with 12 ^{210}Pb, two ^{14}C, & the Mazama tephra

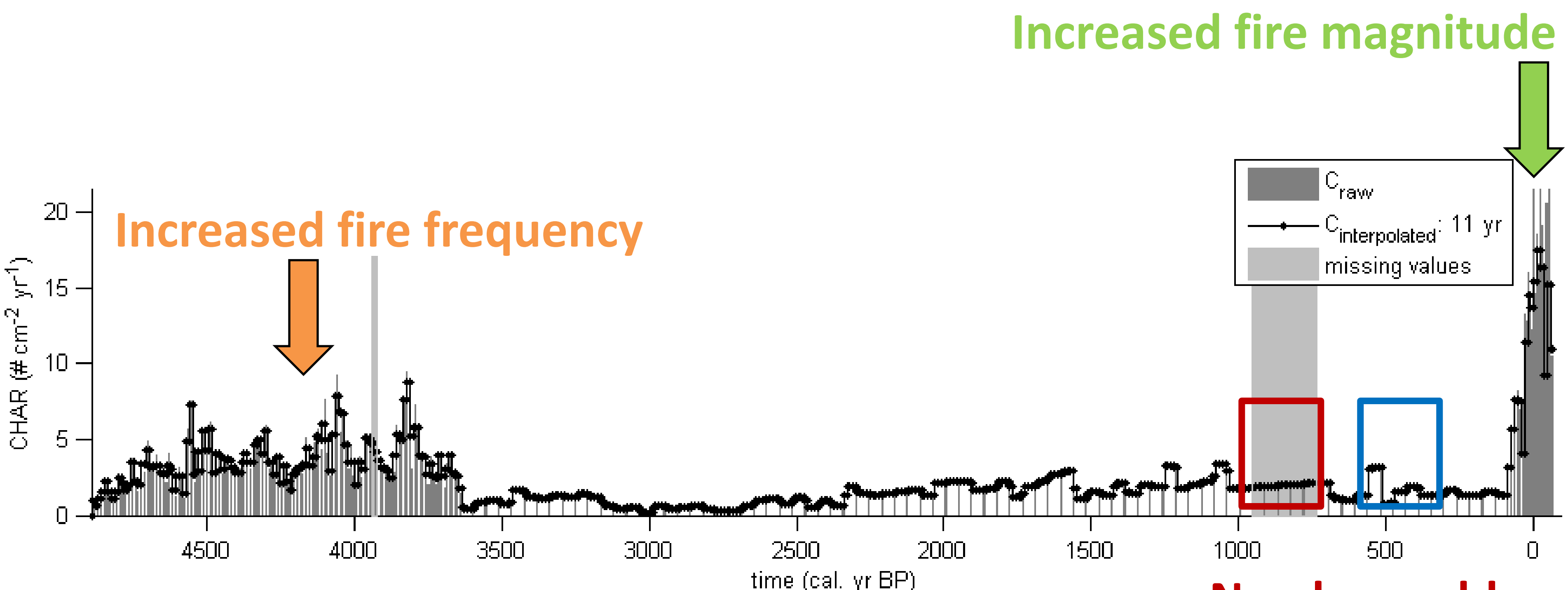


Charcoal Accumulation Rate (CHAR)

- Charcoal extraction (1cm^3 subsample of each 1cm of core)
- [Charcoal] = # charcoal particles ÷ volume
- **CHAR = [Charcoal] x Sediment Accumulation Rate (SAR)**
- CharAnalysis software models background and noise charcoal

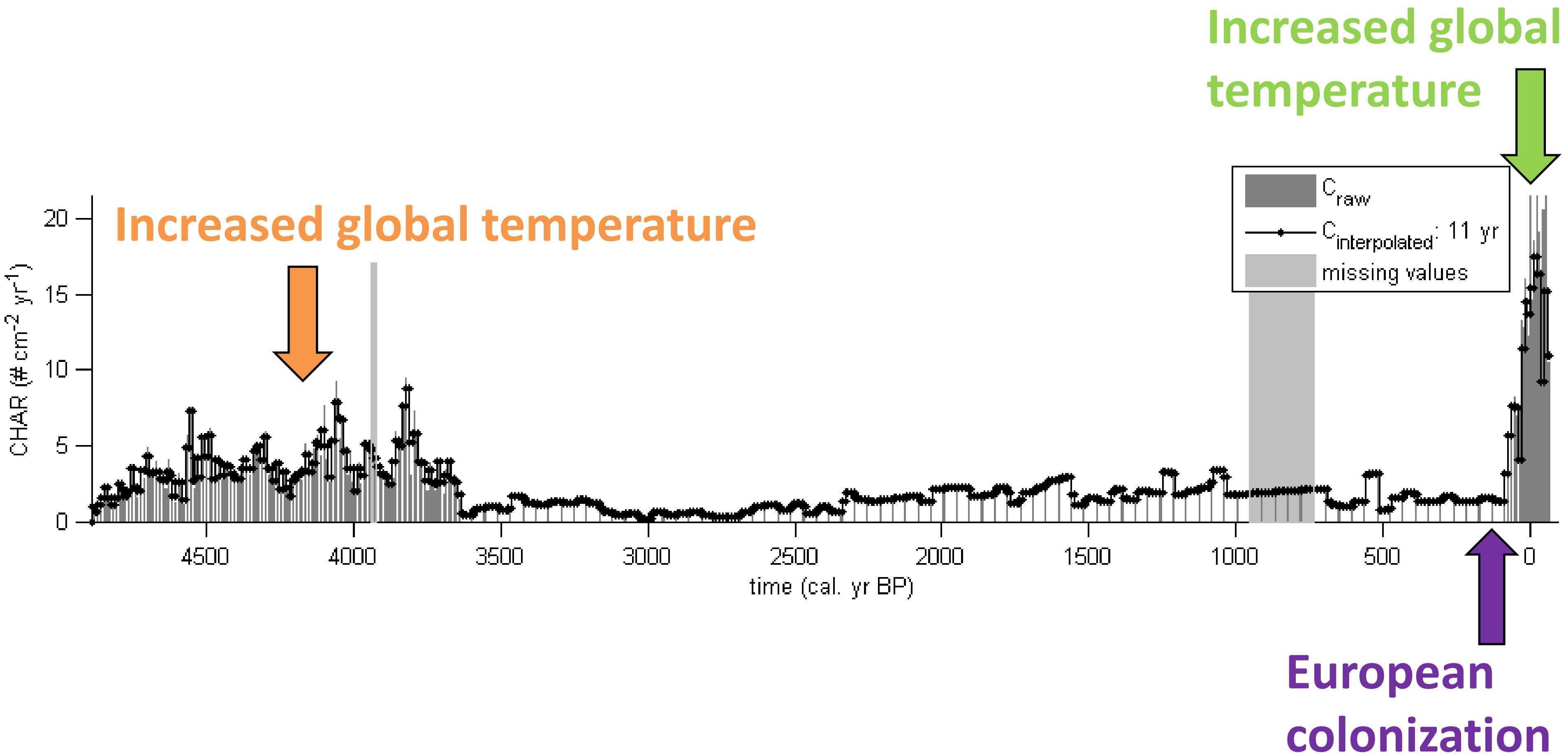


Fire History



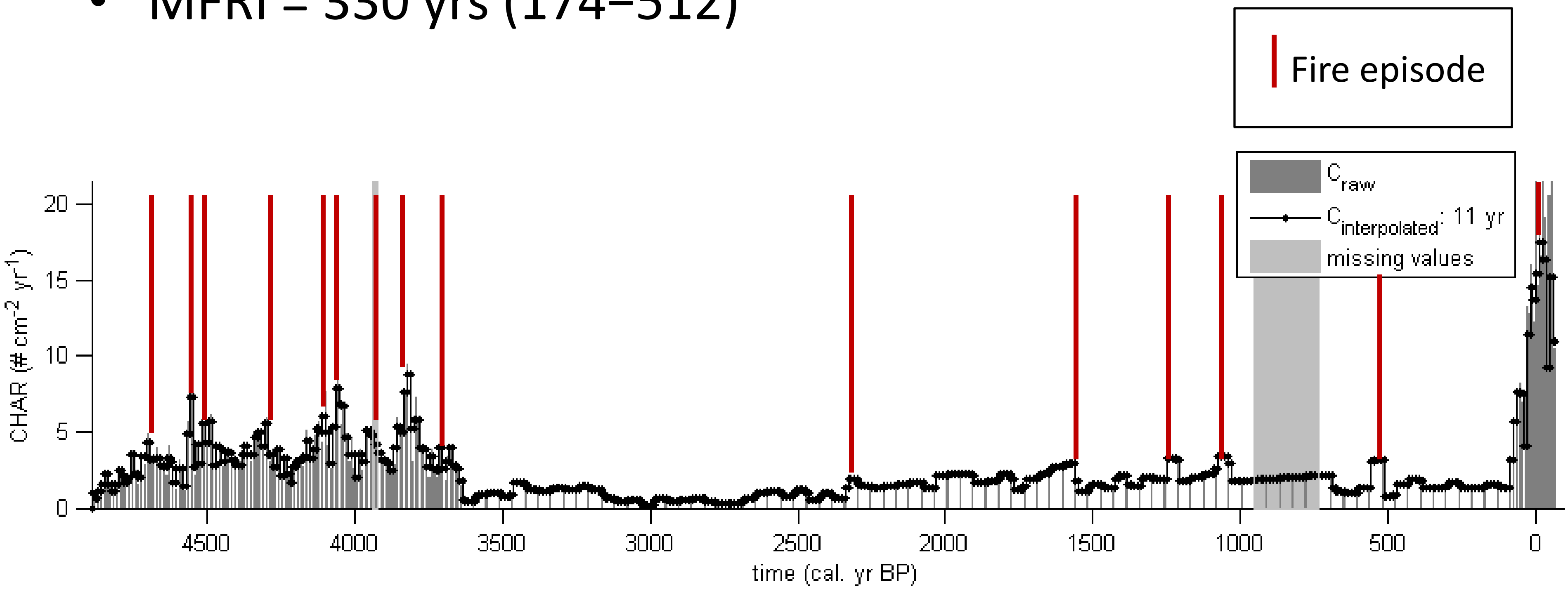
No observable changes during MWP & LIA

Global Climate and Human Influence



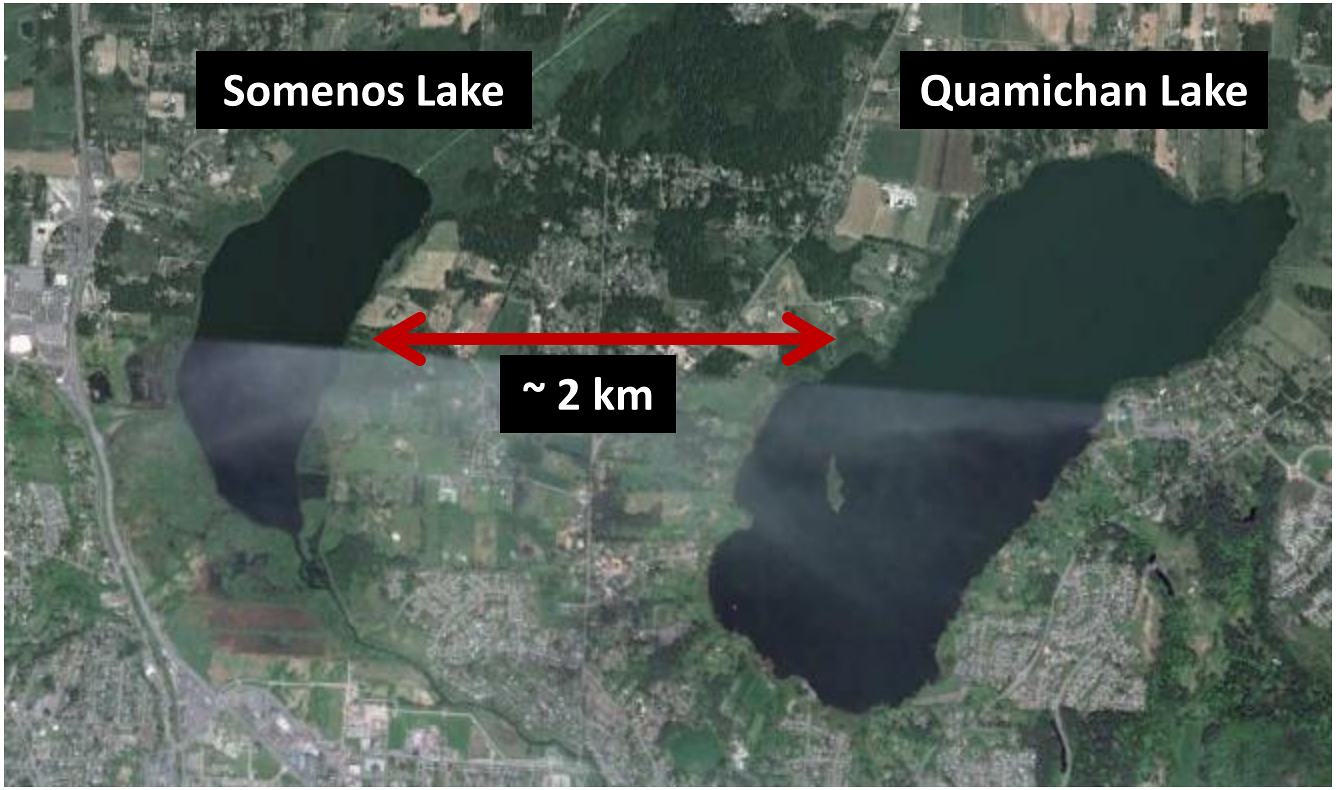
Mean Fire Return Interval

- MFRI = 330 yrs (174–512)



Comparing MFRI with other Studies

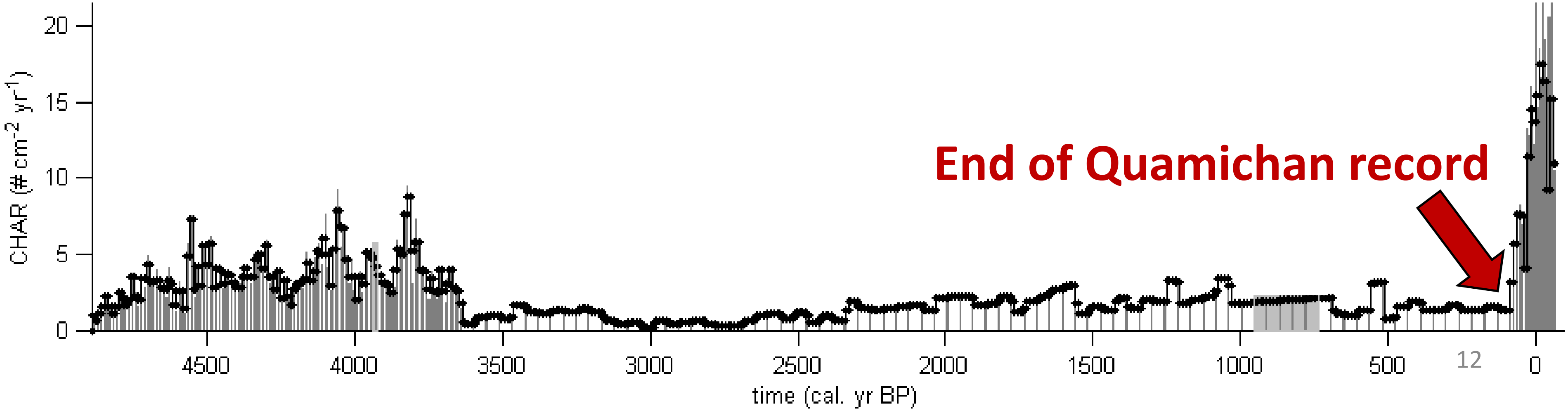
- Somenos Lake → 330 yr MFRI (Murphy, 2014)
- Quamichan Lake → 27 yr MFRI (McCoy, 2006)



Why does MFRI vary?

1. Temporal scale

Lake	Length of Record (yrs)	Bottom Age (cal yr BP)	Top Age (cal yr BP)	MFRI (yrs)
Somenos	**4960**	4904	-63.5	**330**
Quamichan	**250**	196.5	-53.5	**27**
Somenos (Truncated)	**322**	259	-63.5	**81**



Why does MFRI vary?

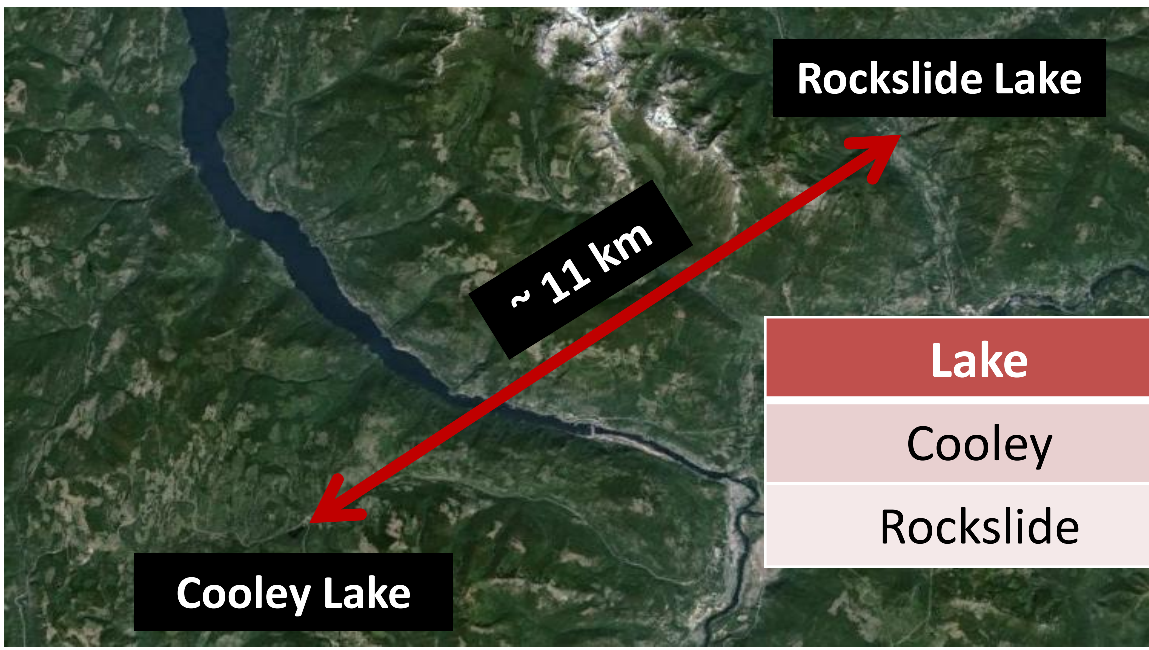
2. **Methodology**
   - Sampling resolution & sediment accumulation rate (SAR)
   - KOH breaks down ~ 12% more charcoal than $(NaPO_3)_6$

Lake	Sample Resolution (cm)	Average SAR over Record (cm/yr)	Length of Record (yrs)	Extraction Method
Somenos	1	**0.1**	322	**5% $(NaPO_3)_6$**
Quamichan	1	**0.5**	250	**30% KOH**

Why does MFRI vary?

3. Local site factors

- Stochastic ignitions, topography & fuel loads
- Connectivity to low elevation, south facing slopes



Lake	MFRI (yrs)
Cooley	**273**
Rockslide	**118**

(Gavin et al., 2006)

Implications for Restoration

1. **Need multi-lake & -proxy analysis to verify MFRI**
   - Chadsey lake
   - Utilize other fire history studies
2. **MFRI provides context for choosing restoration goals & getting fire management programs off the ground**
   - For long-term success, need to be flexible

Questions

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