

# Fire in the land of ice

## Climatic drivers and feedbacks

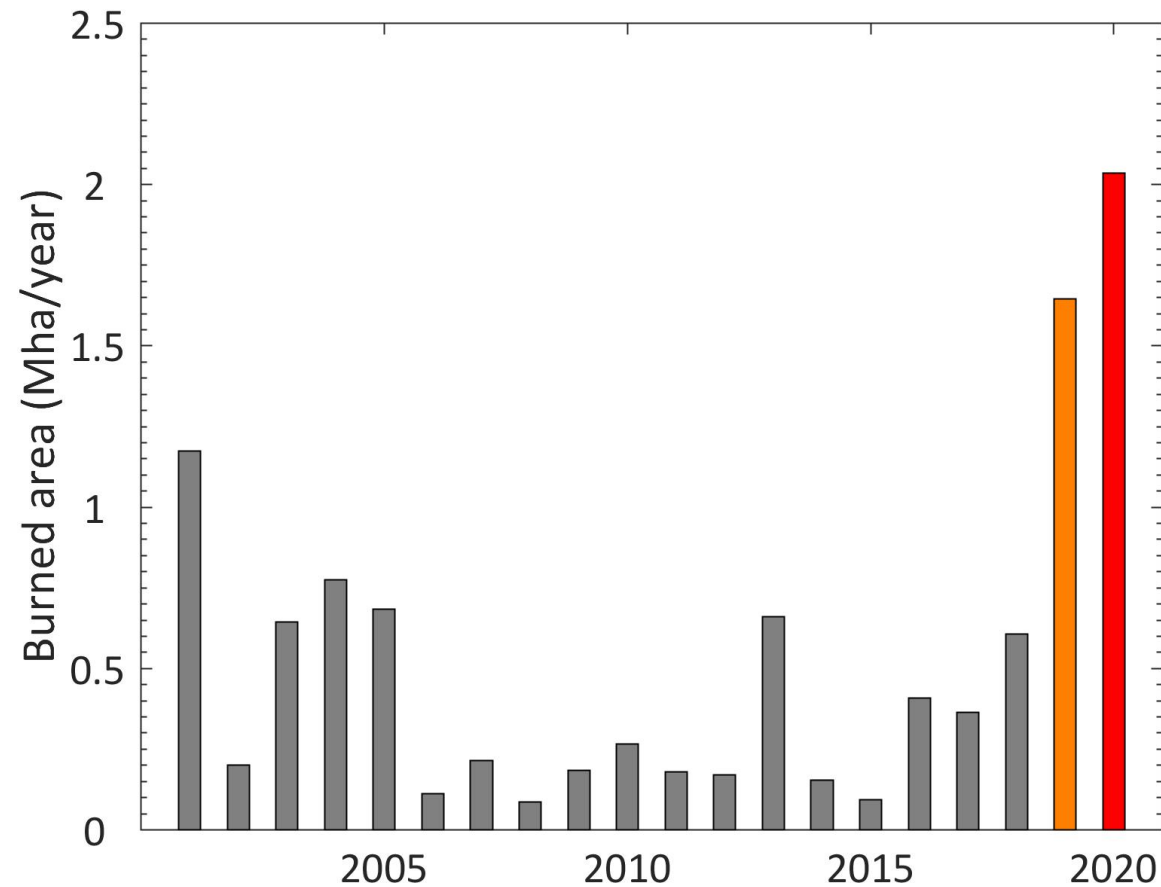
Sander Veraverbeke

VIIRS, June 23, 2020

J. Abatzoglou, C. Delcourt, T. Hessilt, E. Kukavskaya, M. Mack, B. Rogers, R. Scholten, G. van der Werf, X. Walker

- 2019 & 2020 fire seasons in the Arctic
- Lightning ignition efficiency
- Carbon combustion

# 2019 & 2020 fire seasons in the Arctic Circle



# Drivers of lightning ignition efficiency



## LIGHTNING

Polarity & amplitude

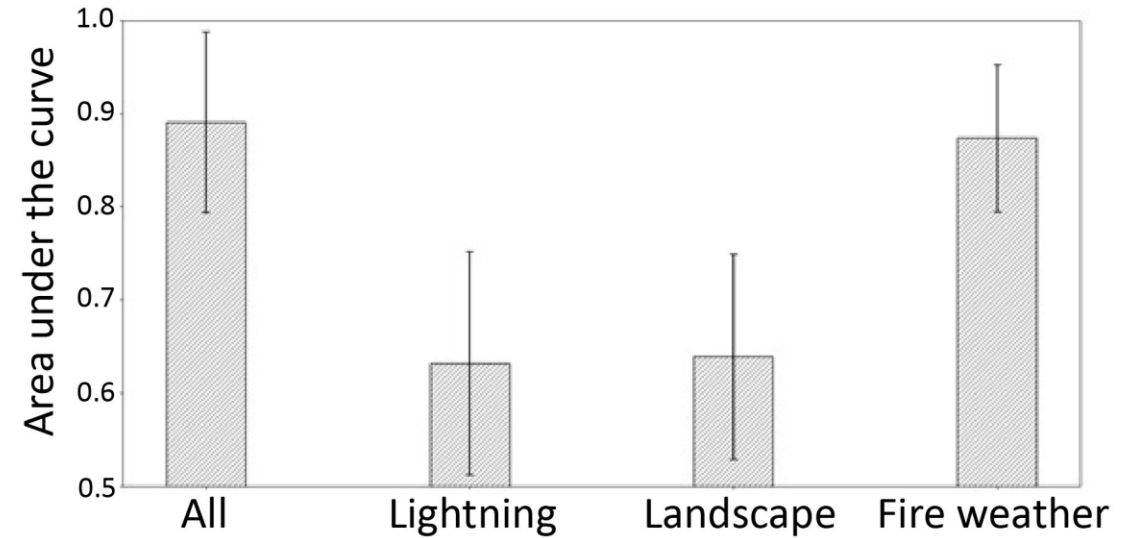


## LANDSCAPE

Elevation & vegetation

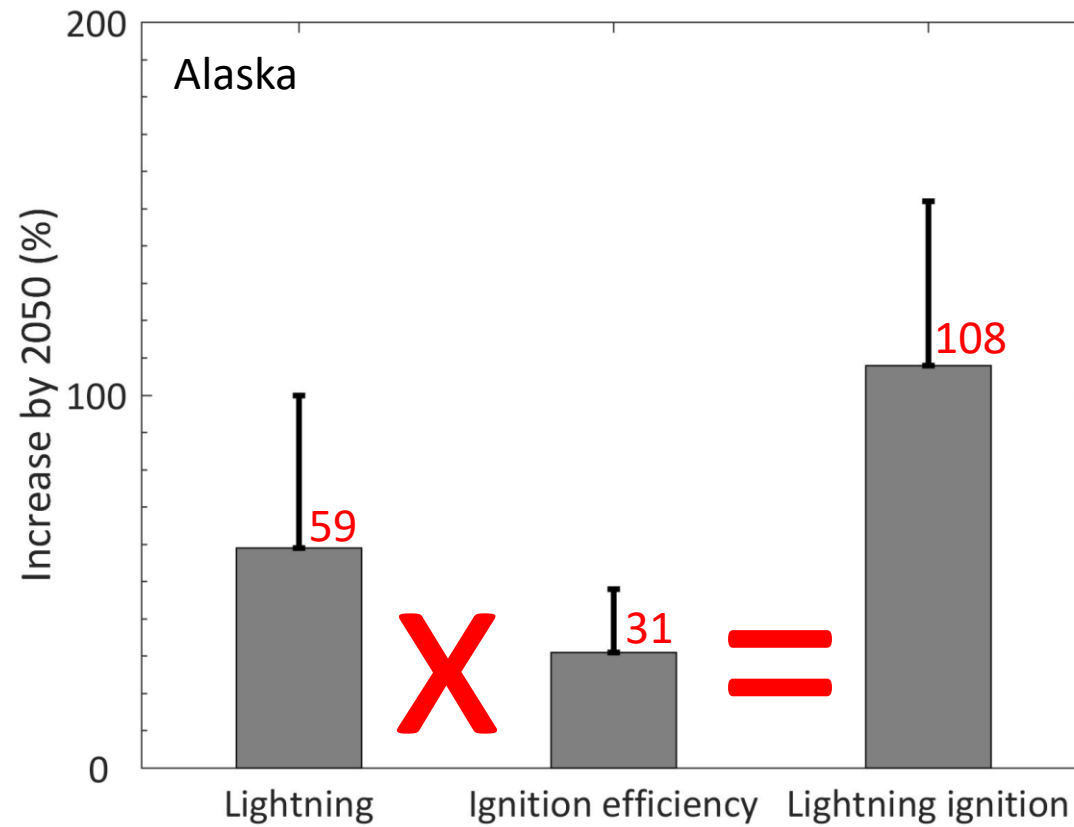


## FIRE WEATHER



**Fire weather** strongly influences when a lightning strike starts an ignition

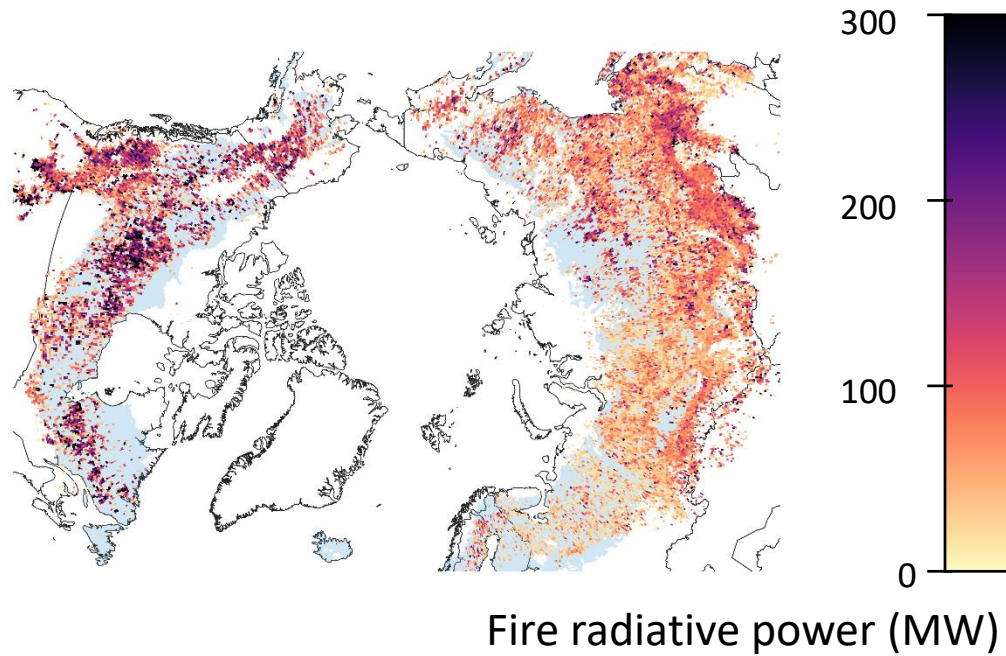
# Future lightning ignition



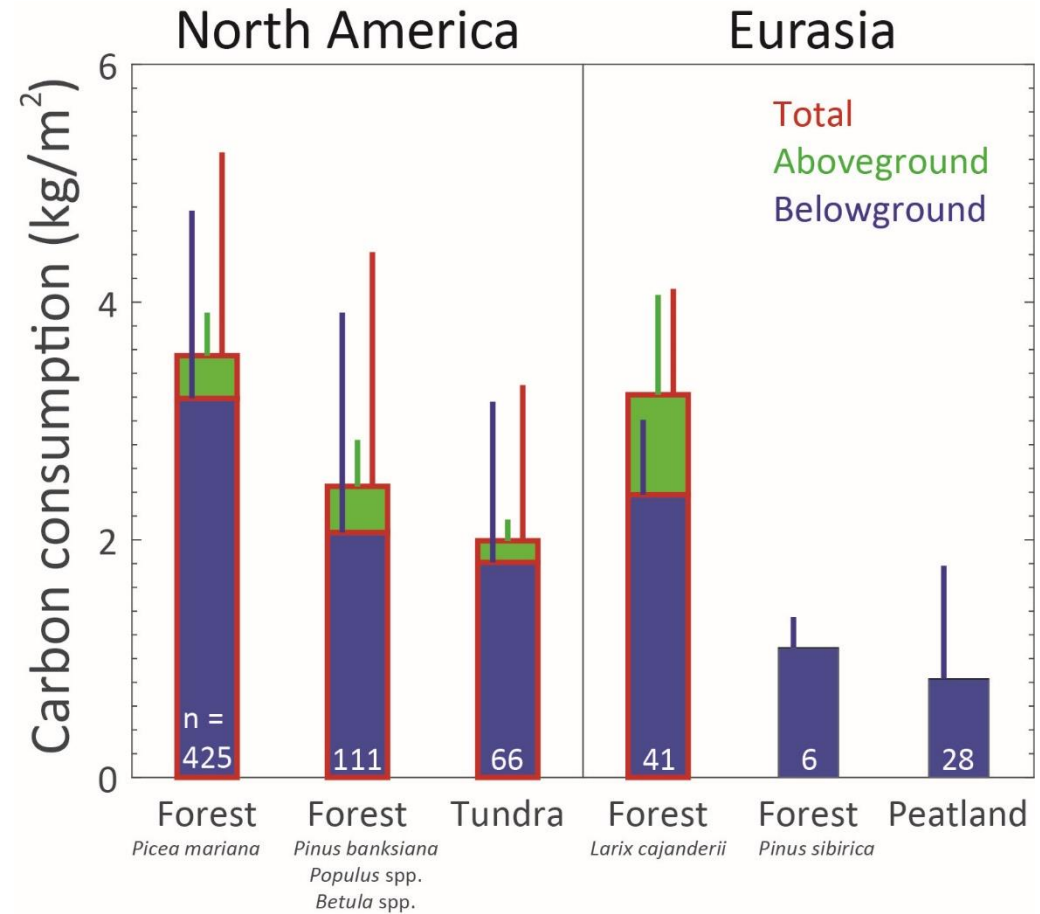
Veraverbeke et al. (2017)

Increases in  
*lightning*  
and  
*ignition efficiency*  
will **reinforce** each other

# Carbon combustion



Rogers et al. (2015)





- Intermediate landscape position:
  - Highest combustion
  - Release of legacy carbon
  - Permafrost thaw
- High resolution information needed

Walker et al. (2020)

# In summary

- **2019 & 2020** Arctic fire seasons: 2 record years in a row
- Increases in lightning and **ignition efficiency** will reinforce each other
- Detailed knowledge on fuels needed to better understand **carbon emissions**, including more measurements in Siberia

Thanks!



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