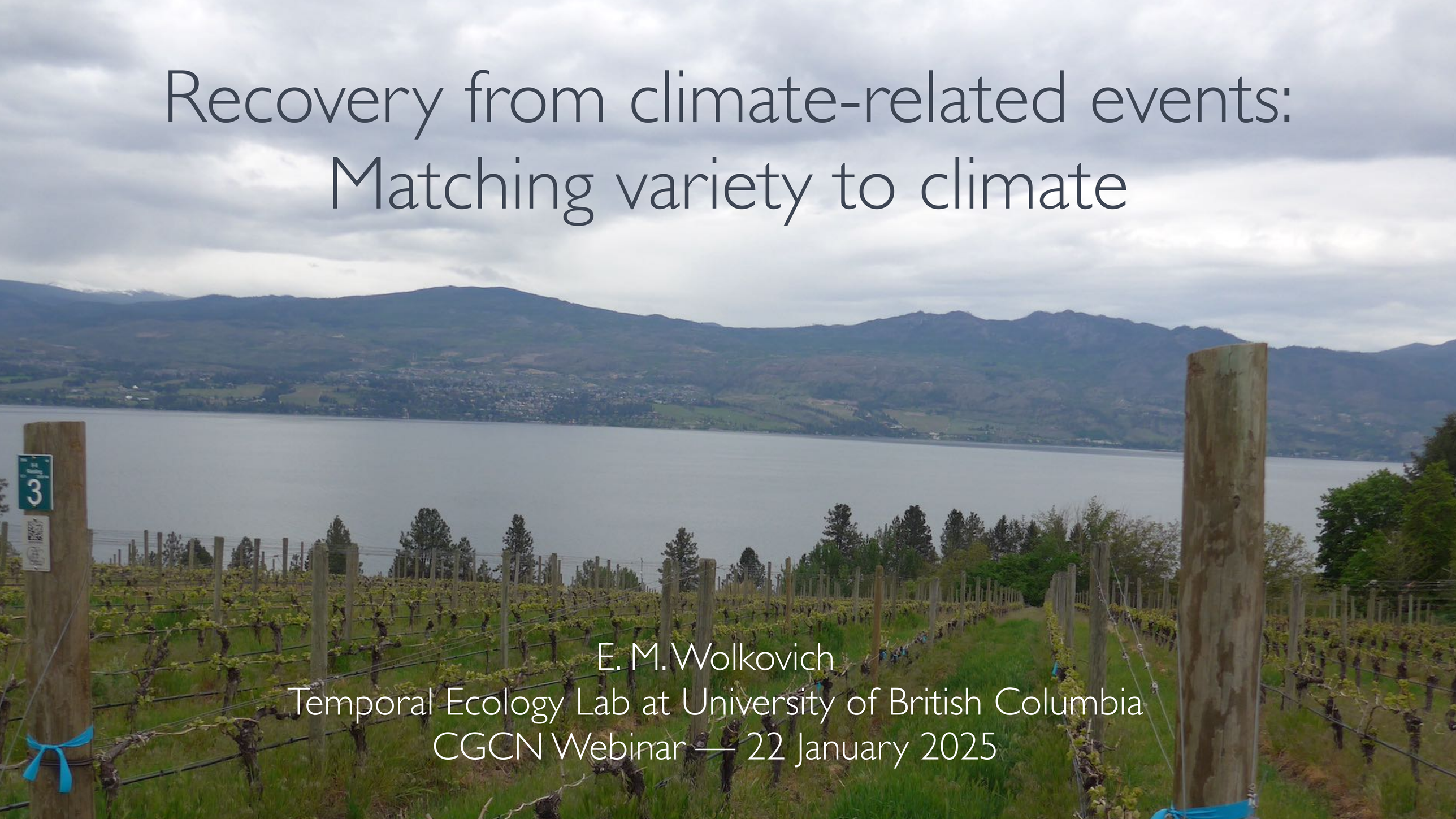
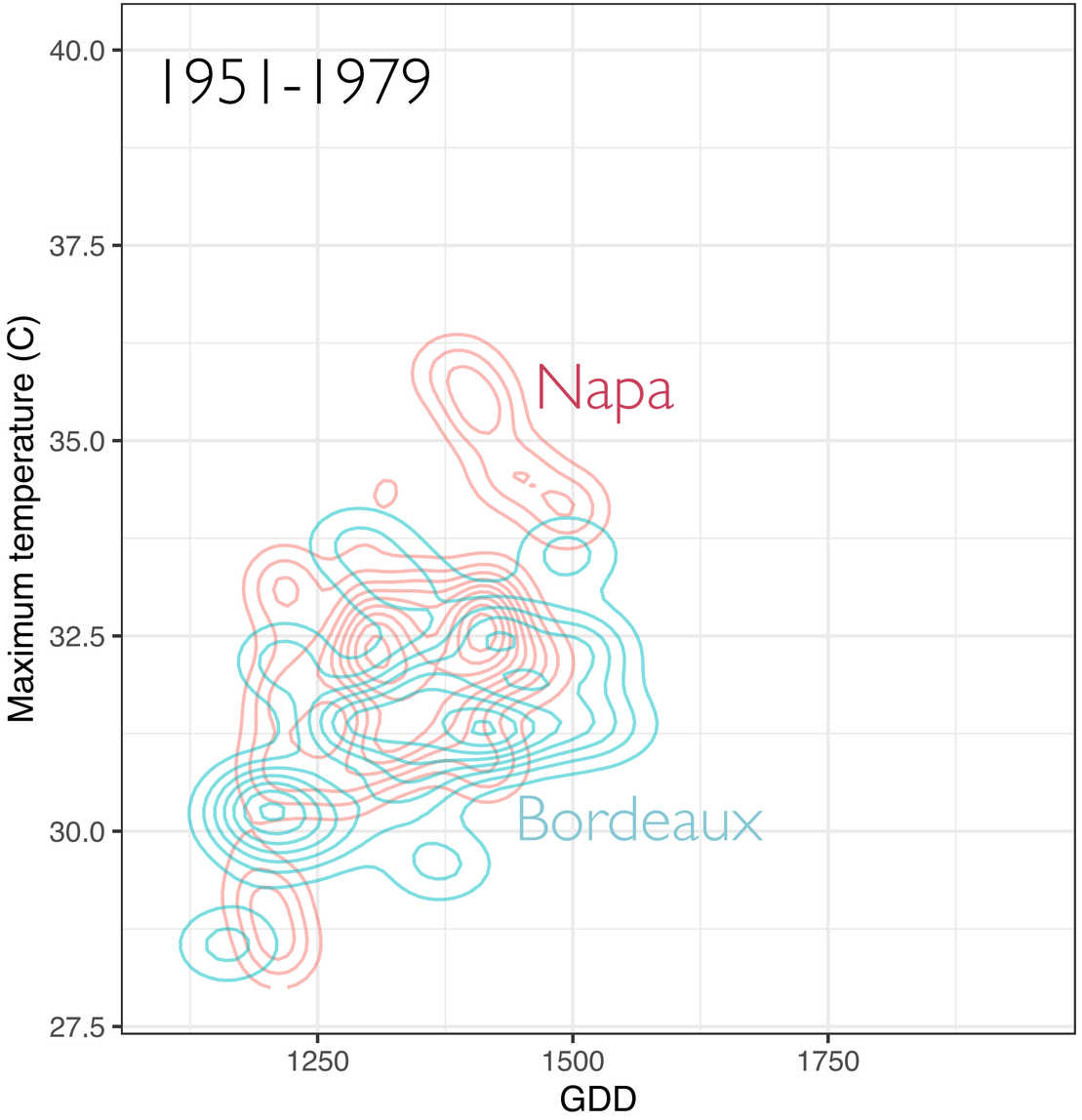
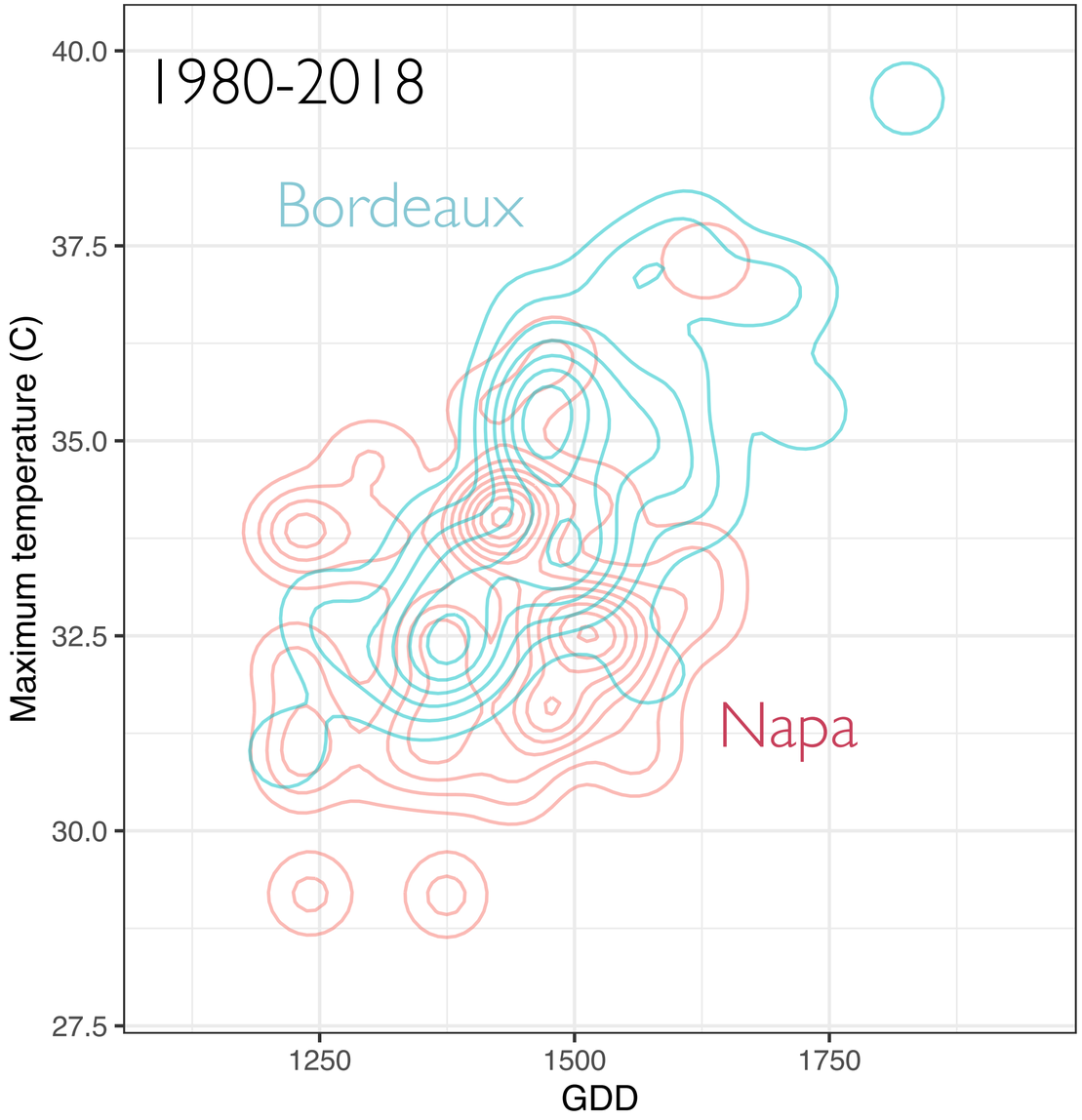
Recovery from climate-related events: Matching variety to climate



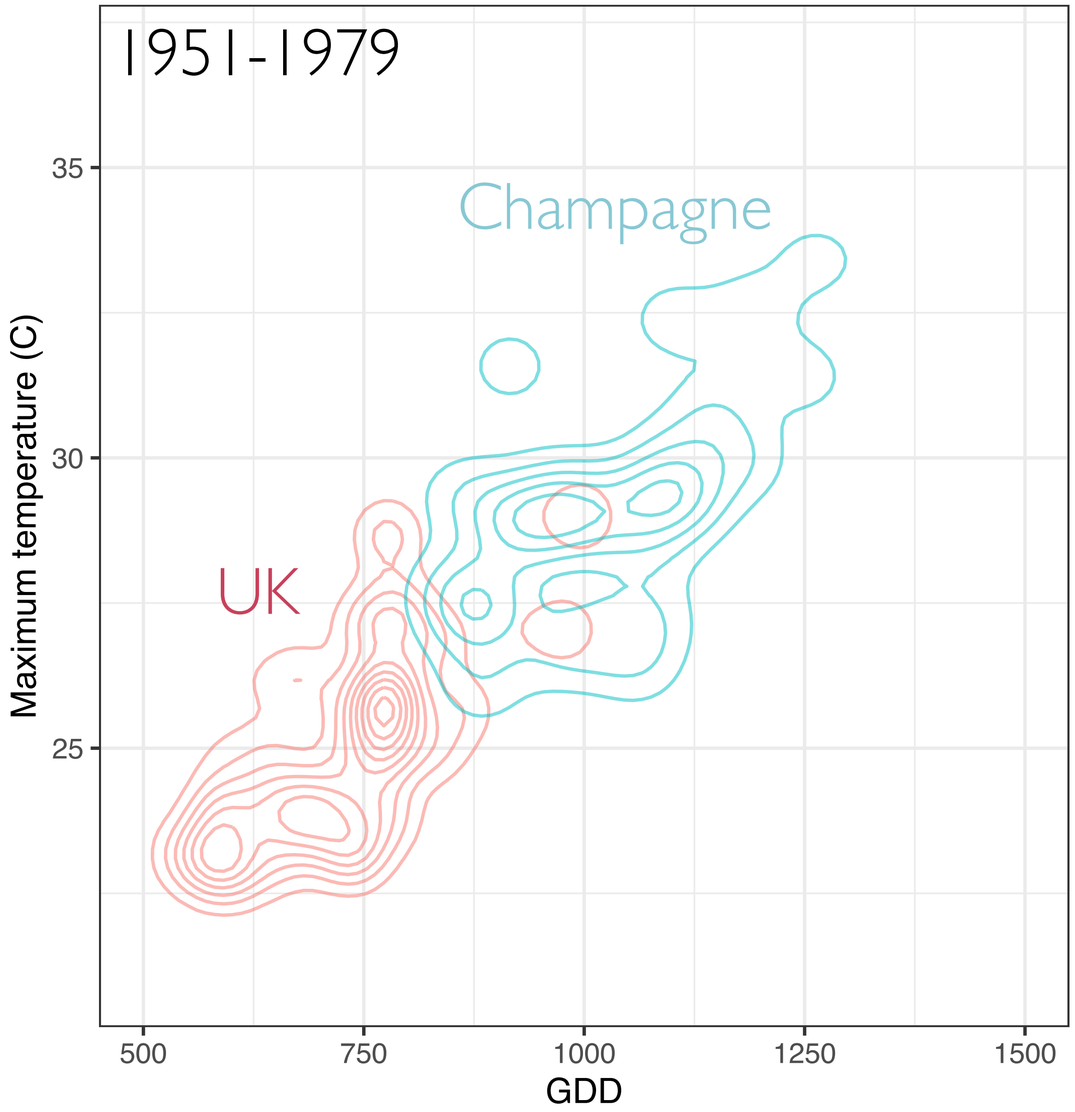
E. M. Wolkovich
Temporal Ecology Lab at University of British Columbia
CGCN Webinar — 22 January 2025

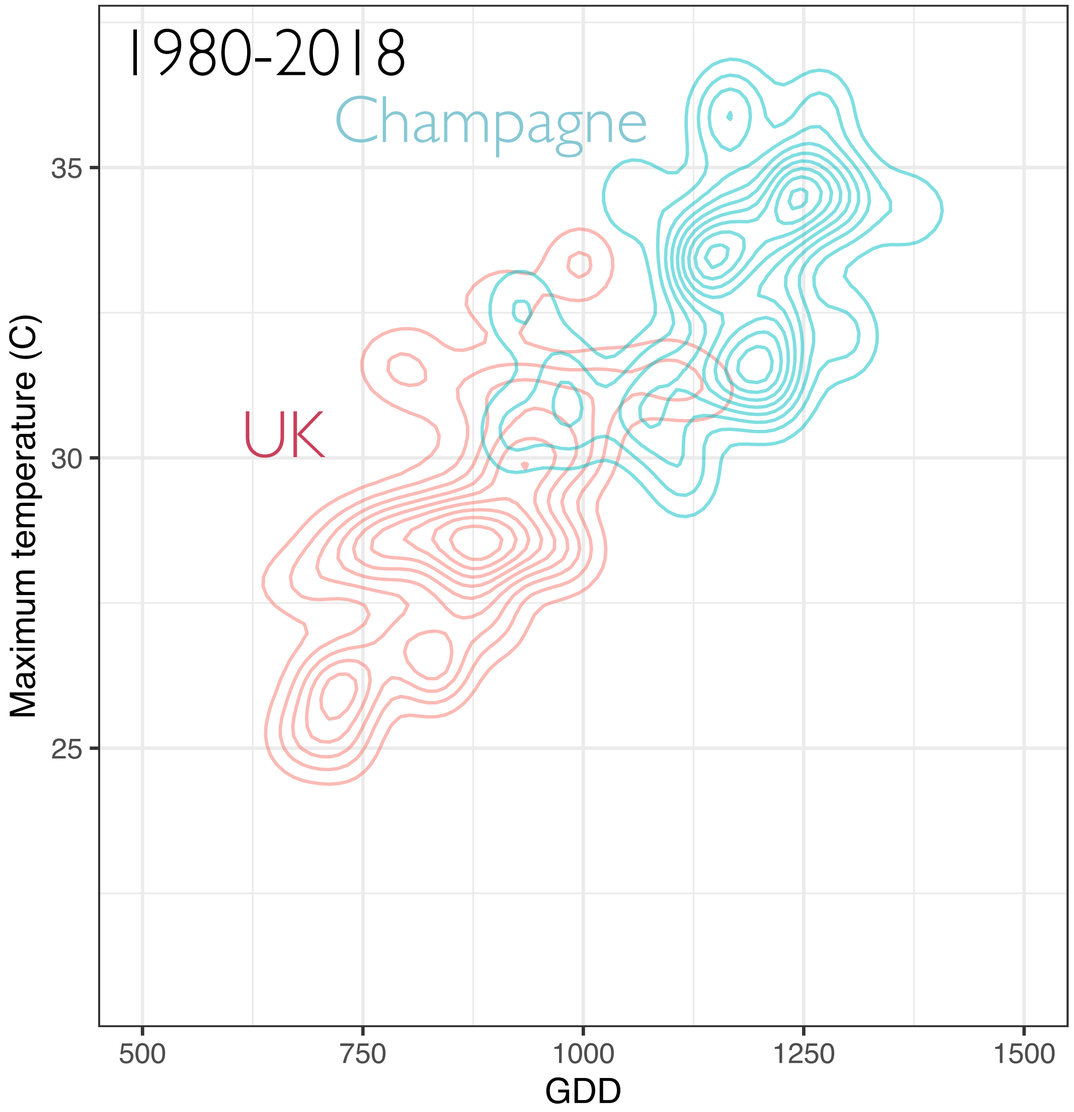
Climate space of terroir



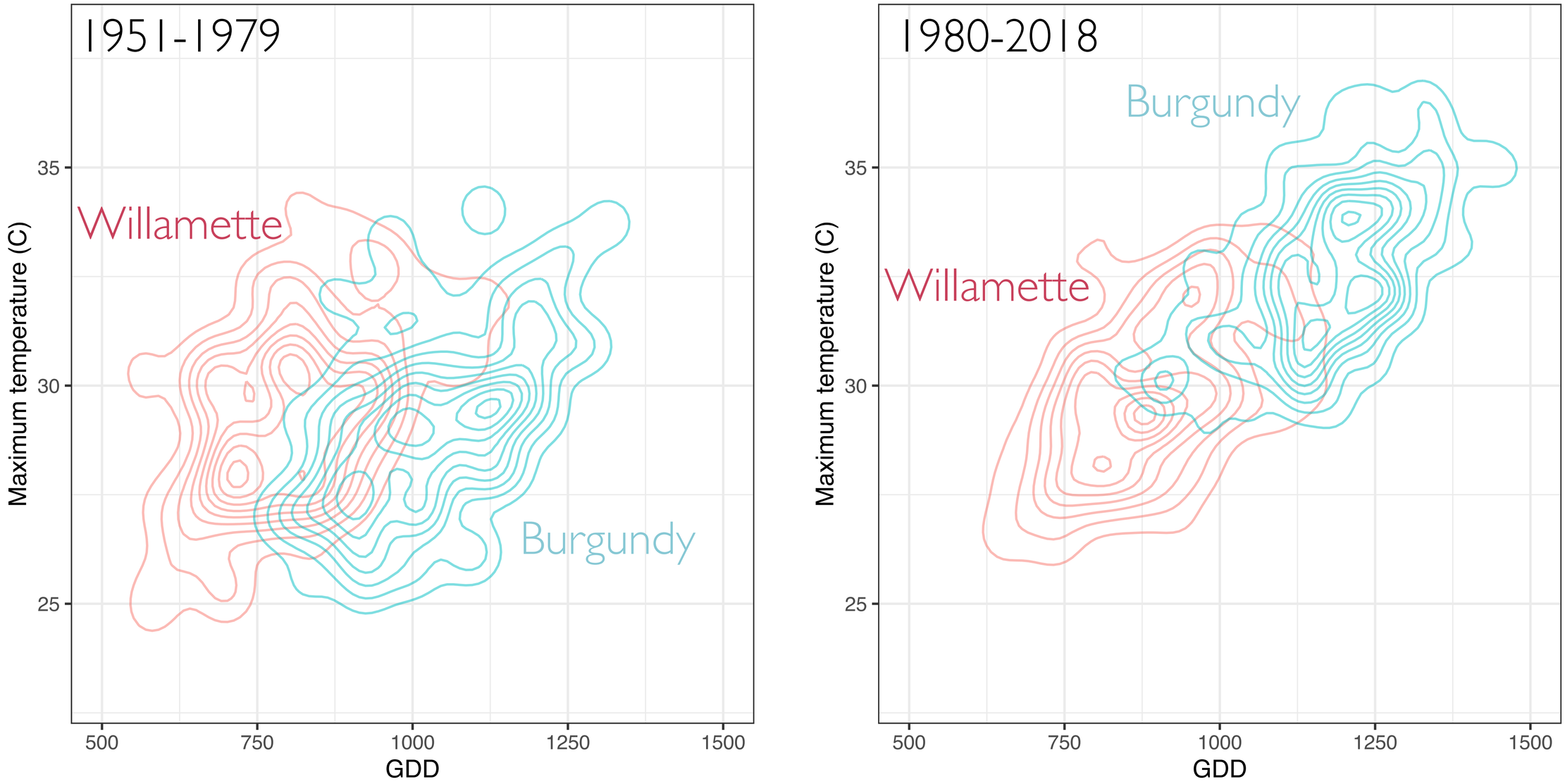


Climate space of terroir

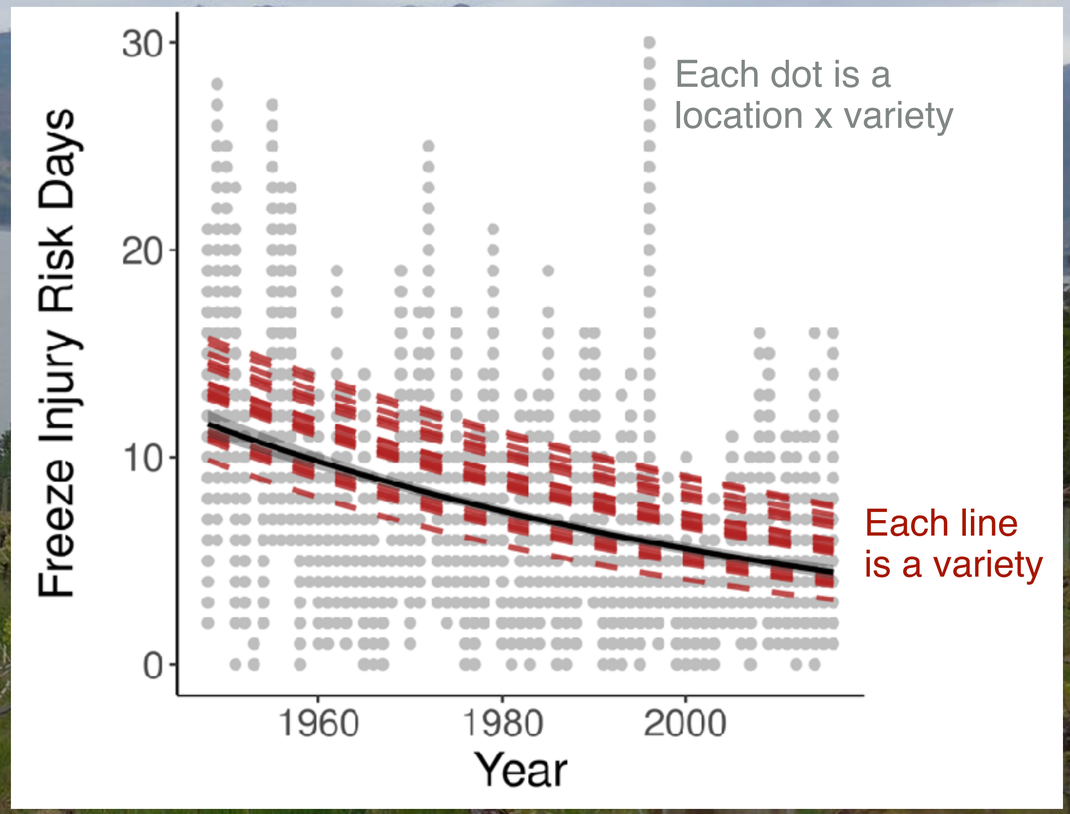




Climate space of terroir

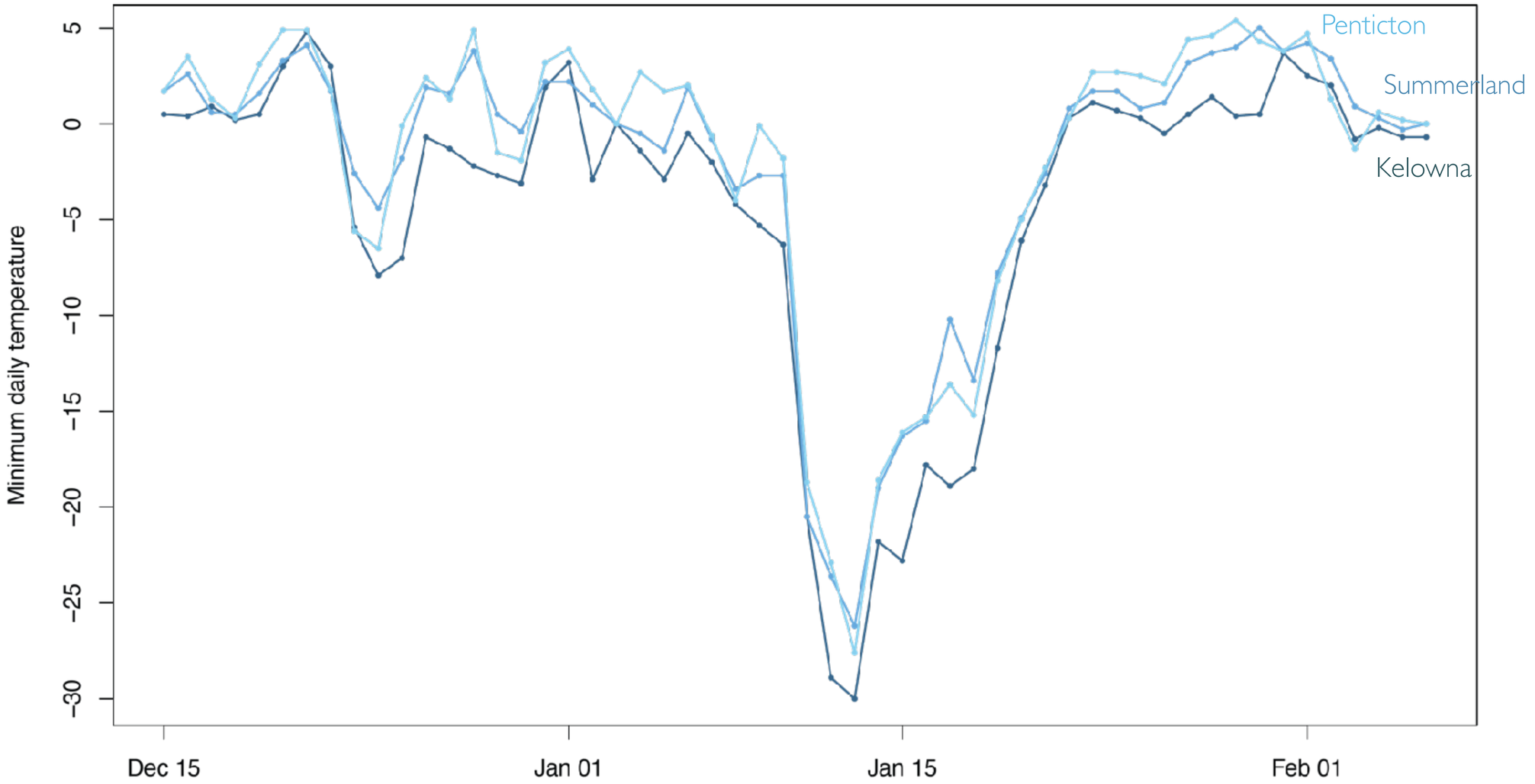


Climate change in the Okanagan

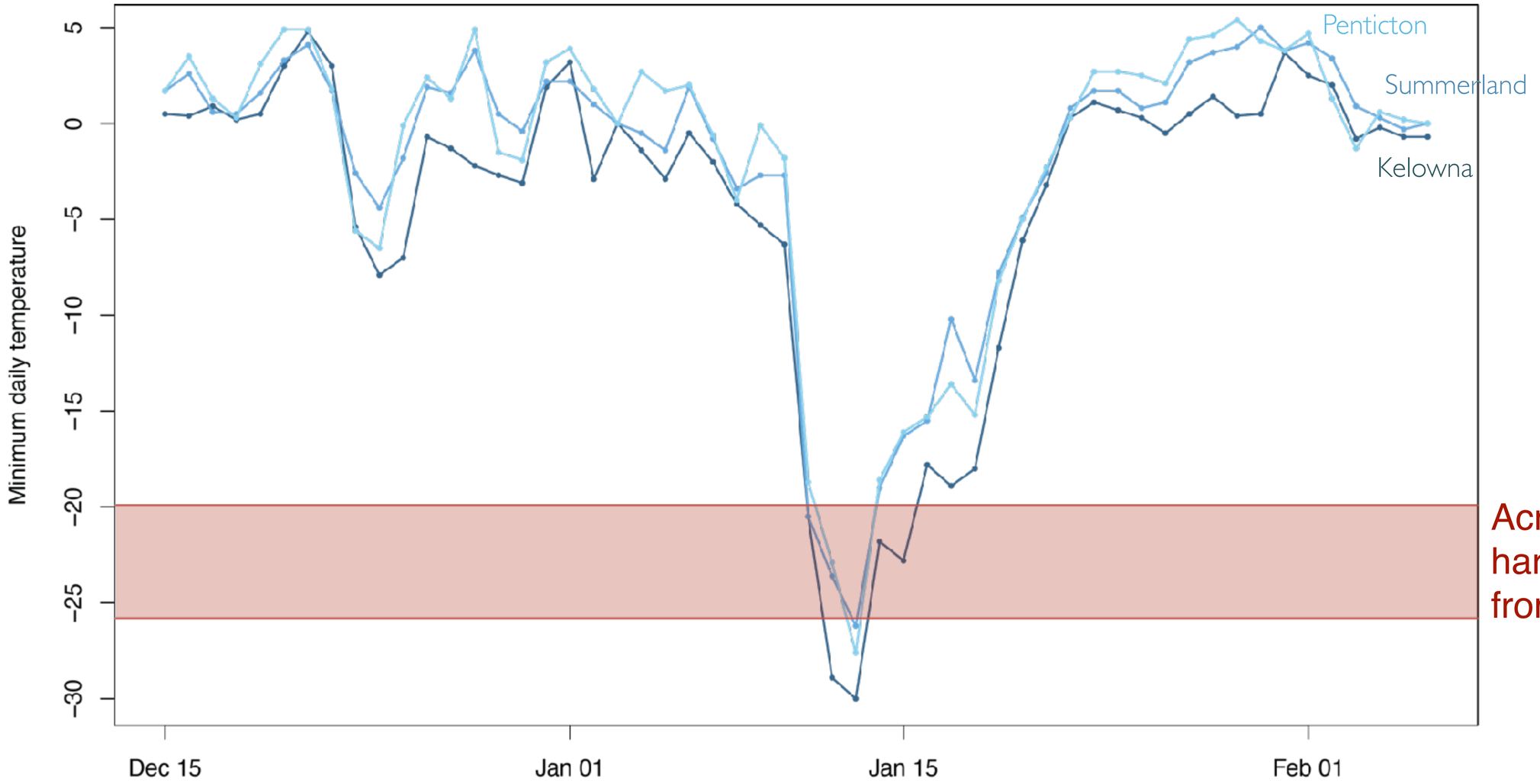


Jones, Bogdanoff & Wolkovich, *Am. Jour. of Botany,* 2023

Cold event in January 2024



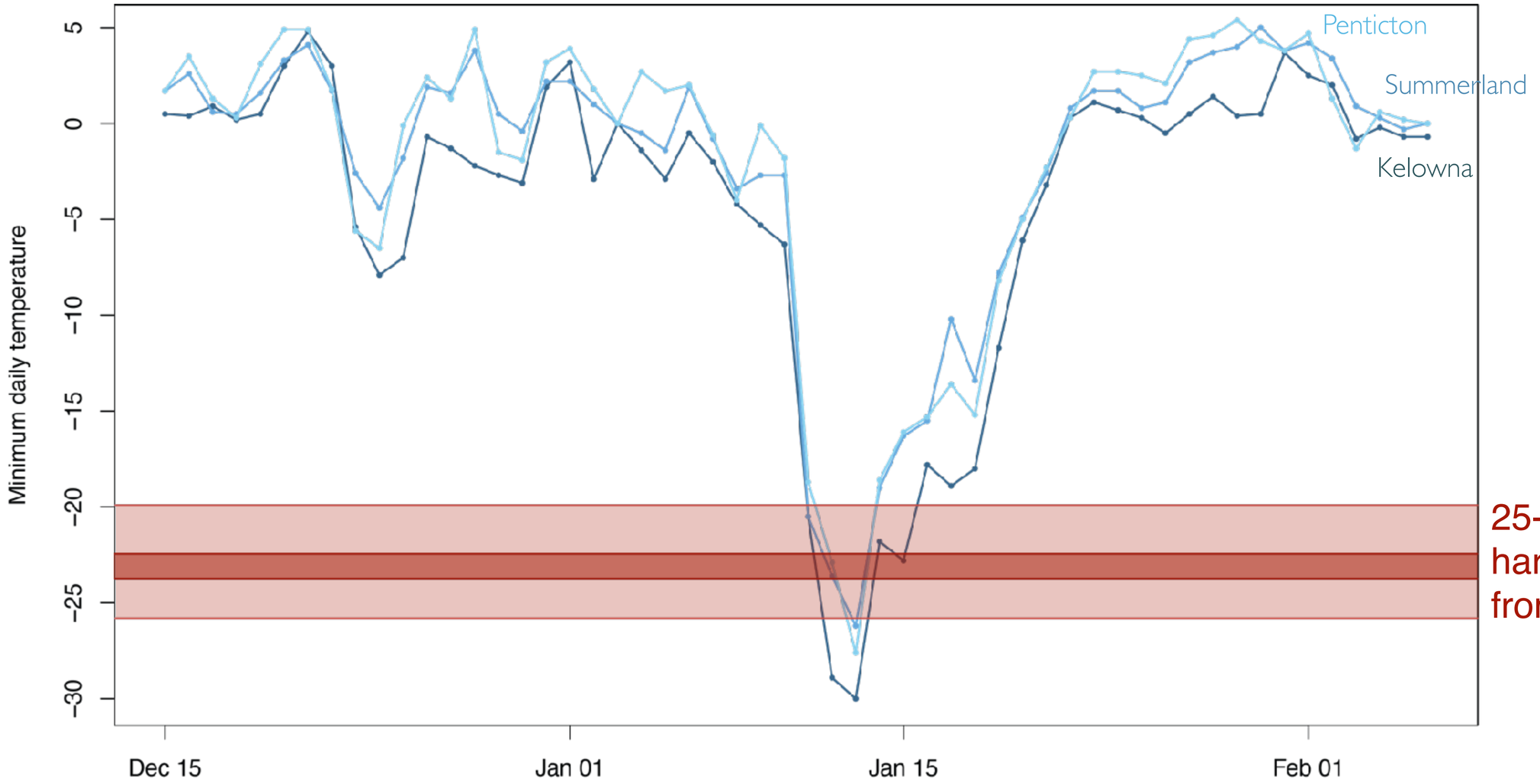
Cold event in January 2024



Across sites & varieties
hardiness values
from Summerland RDC

Steve Marsh, 10-11 Jan 2024 hardiness values (50% LTE)

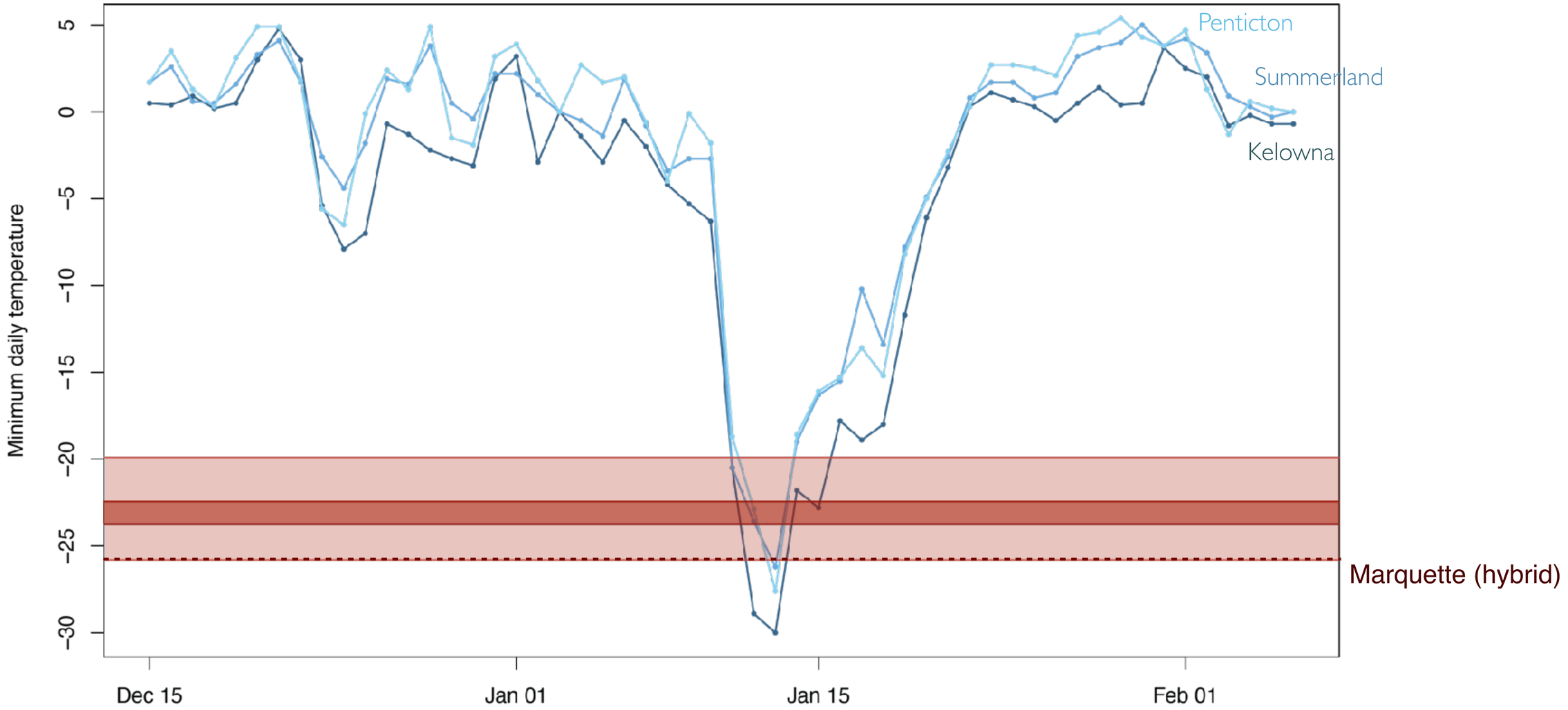
Cold event in January 2024



25-75% of hardiness values from Summerland RDC

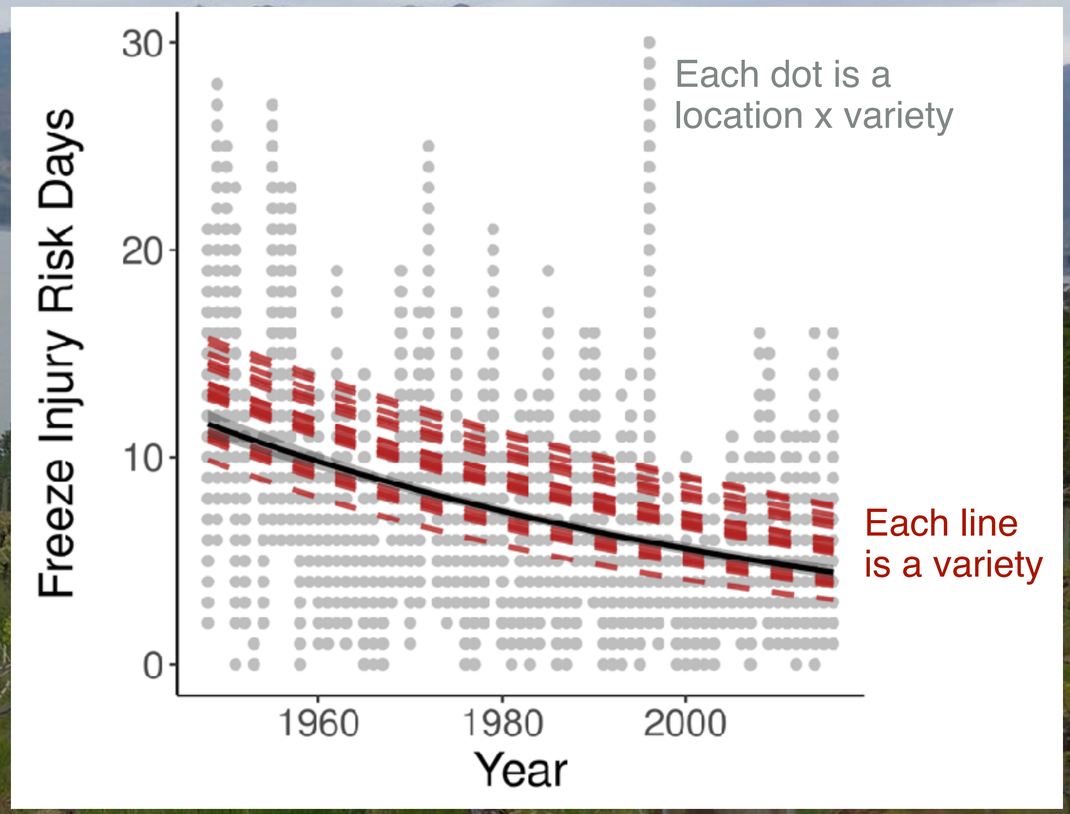
Steve Marsh, 10-11 Jan 2024 hardiness values (50% LTE)

Cold event in January 2024



Steve Marsh, 10-11 Jan 2024 hardiness values (50% LTE)

Climate change in the Okanagan



Jones, Bogdanoff & Wolkovich, *Am. Jour. of Botany,* 2023

Climate & variety suitability

- Why variety phenology matters
- How variety diversity buffers winegrowing regions
- Adaptation: How regions are adapting

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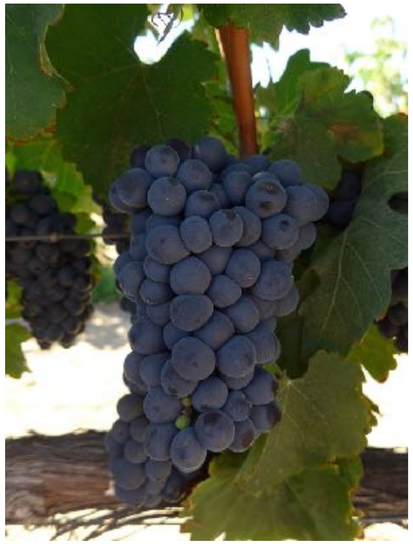
Variety phenology & consequences

Budburst

Flowering

Veraison



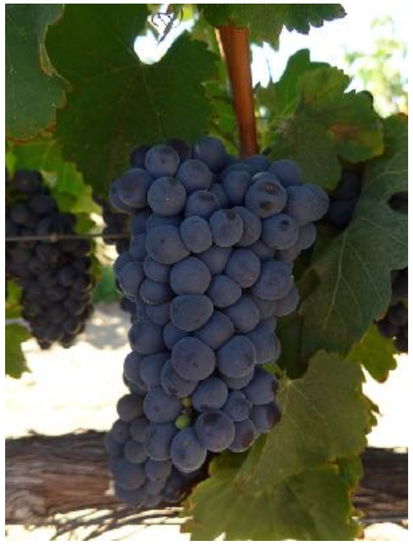
Maturity

Variety phenology & consequences

Budburst

Flowering

Veraison



Maturity

1) Must ripen within growing season

Variety phenology & consequences

Budburst

Flowering

Veraison

Maturity

1) Must ripen within growing season

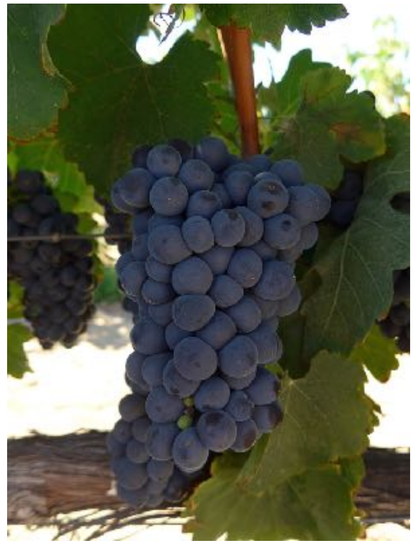
2) Adequate temperatures for fruitset (**yield**)

Phenological sequences & consequences

Budburst

Flowering

Veraison



Maturity

1) Must ripen within growing season

2) Adequate temperatures for fruitset (**yield**)

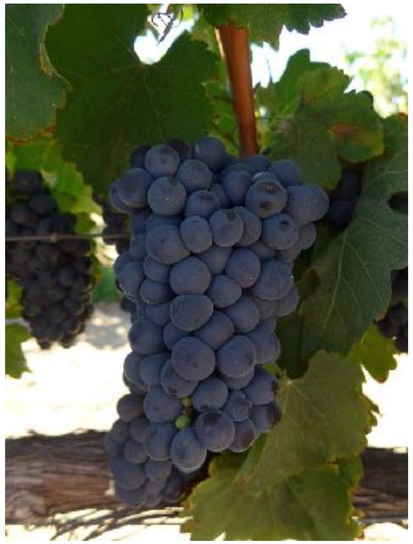
3) Ideal climate for ripening (**quality**)

Variety phenology & consequences

Budburst

Flowering

Veraison



Maturity

1) Must ripen within growing season

2) Adequate temperatures for fruitset (**yield**)

3) Ideal climate for ripening (**quality**)


3

Phenology determines climate hazards

Budburst

Flowering

Veraison

Maturity

1) Determines frost risk

Phenology determines climate hazards

Budburst

Flowering

Veraison

Maturity

1) Determines frost risk

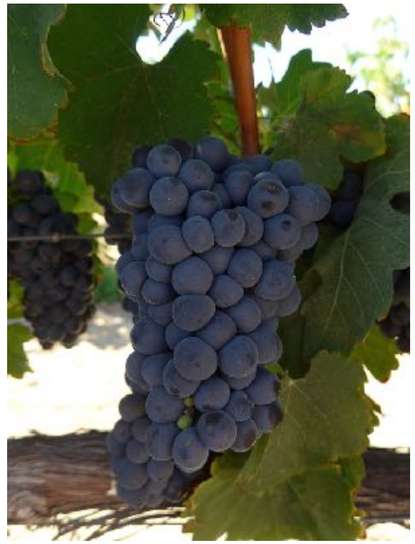
2) Heat extremes reduce or destroy yield

Phenology determines climate hazards

Budburst

Flowering

Veraison



Maturity

1) Must ripen within growing season

2) Heat extremes reduce or destroy yield

3) Smoke readily absorbed during veraison/ripening.

Phenology determines climate hazards

Budburst

Flowering

1) Must ripen within growing season

2) Heat extremes reduce

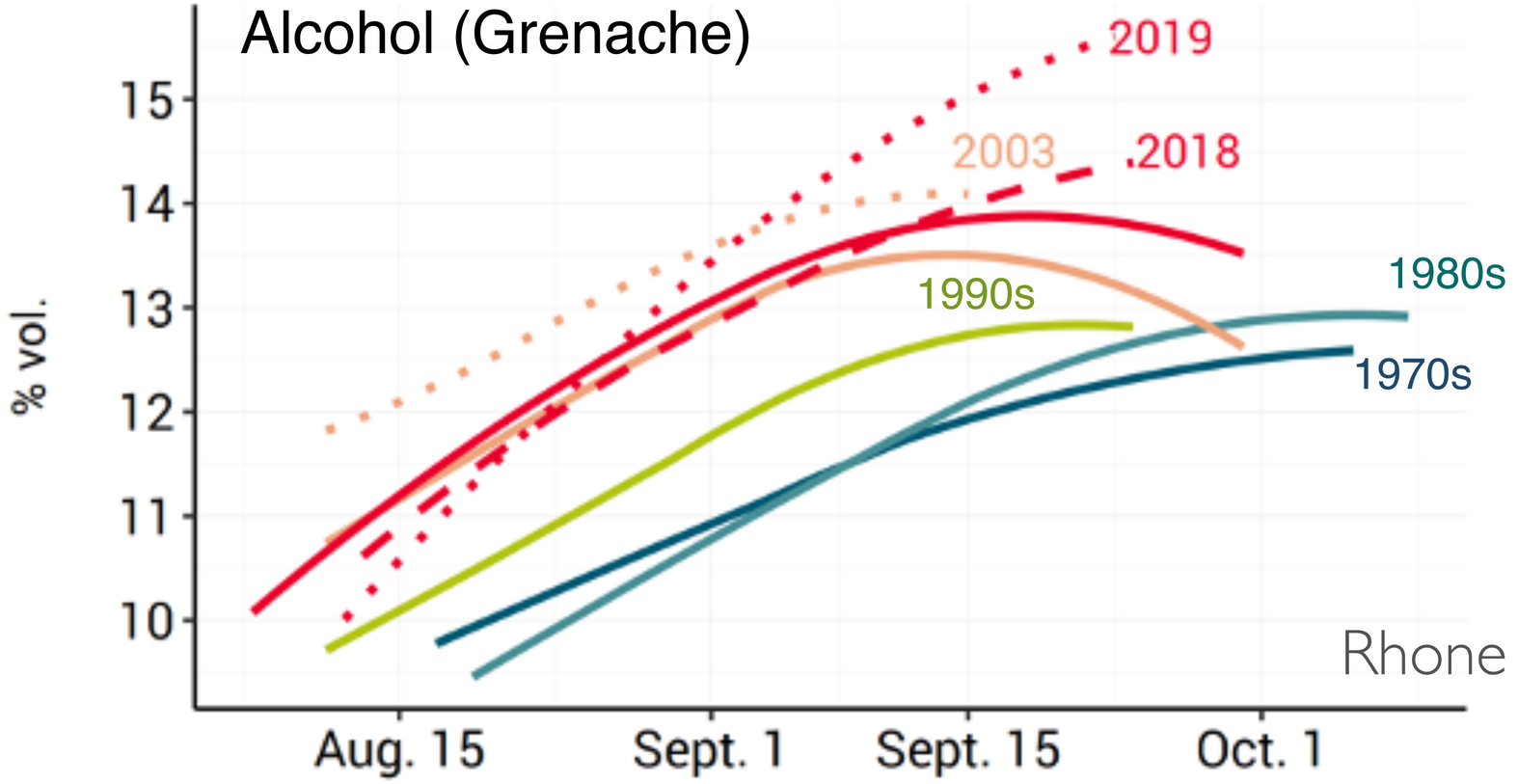
3) Smoke readily absorbed during veraison/ripening.

Phenology determines climate hazards

Budburst

1) Must ripen within g

2) Heat



3) Higher temperatures increase sugar, reduce acid, reshape aromatic and phenolic profiles

Becart *et al.* 2022

Climate & variety suitability

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Climate & variety suitability

- Why variety phenology matters
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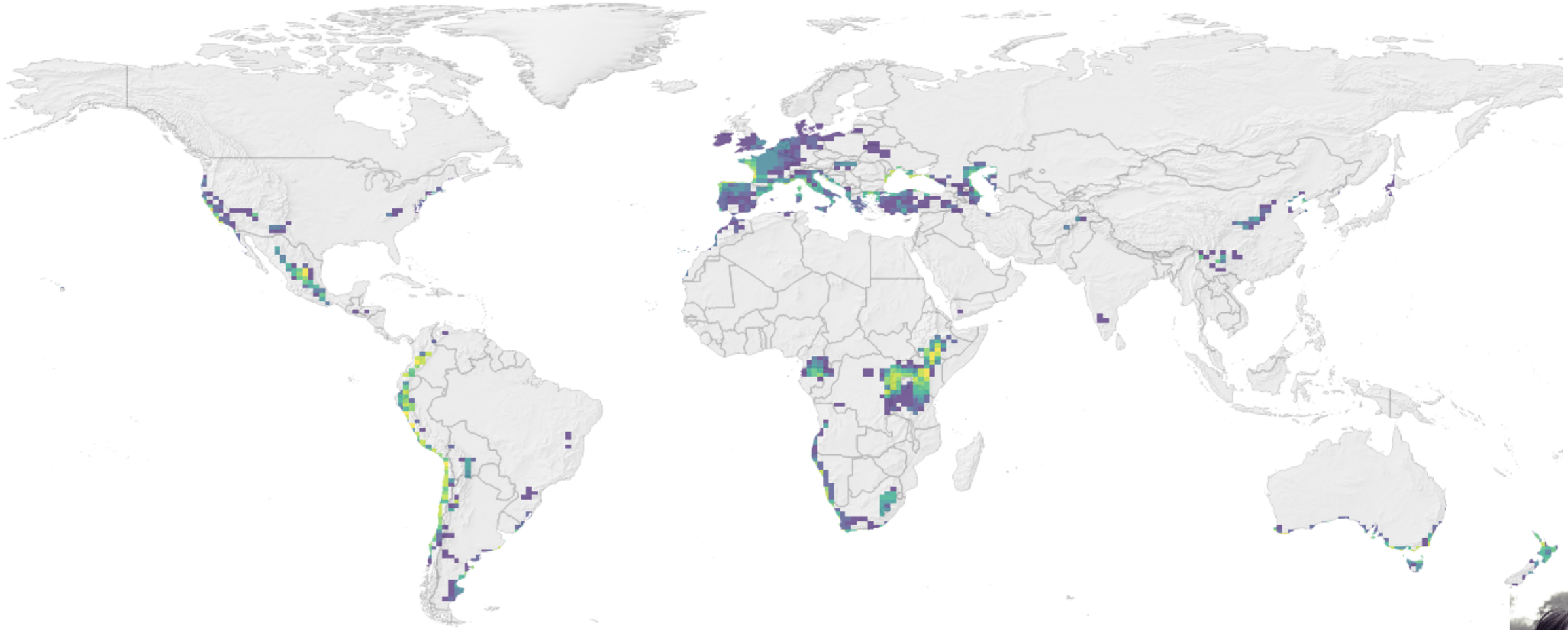
Ignacio Morales-Castilla
Iñaki Garcia de Cortazar Atuari

Predicted suitable wine growing regions

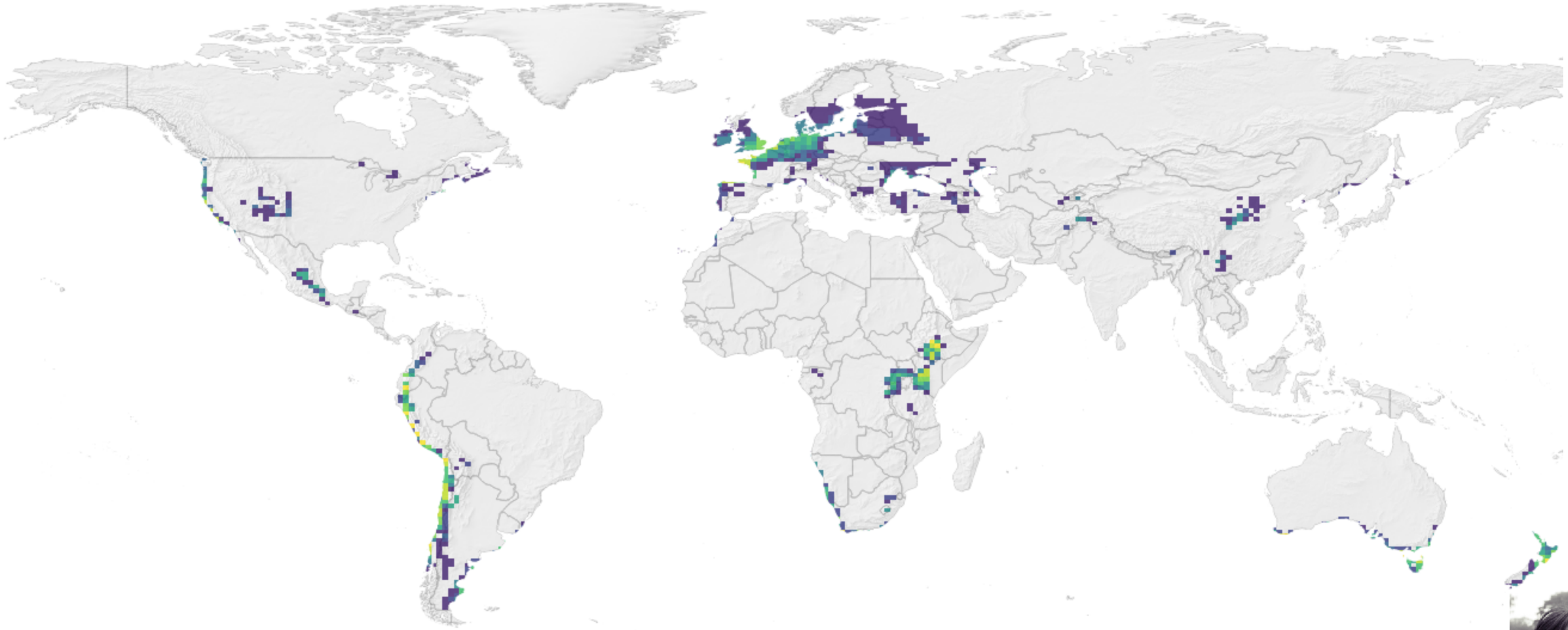


Cultivar diversity 0ºC

1 11

Morales-Castilla *et al. PNAS,* 2020

Future predicted regions at 2°C

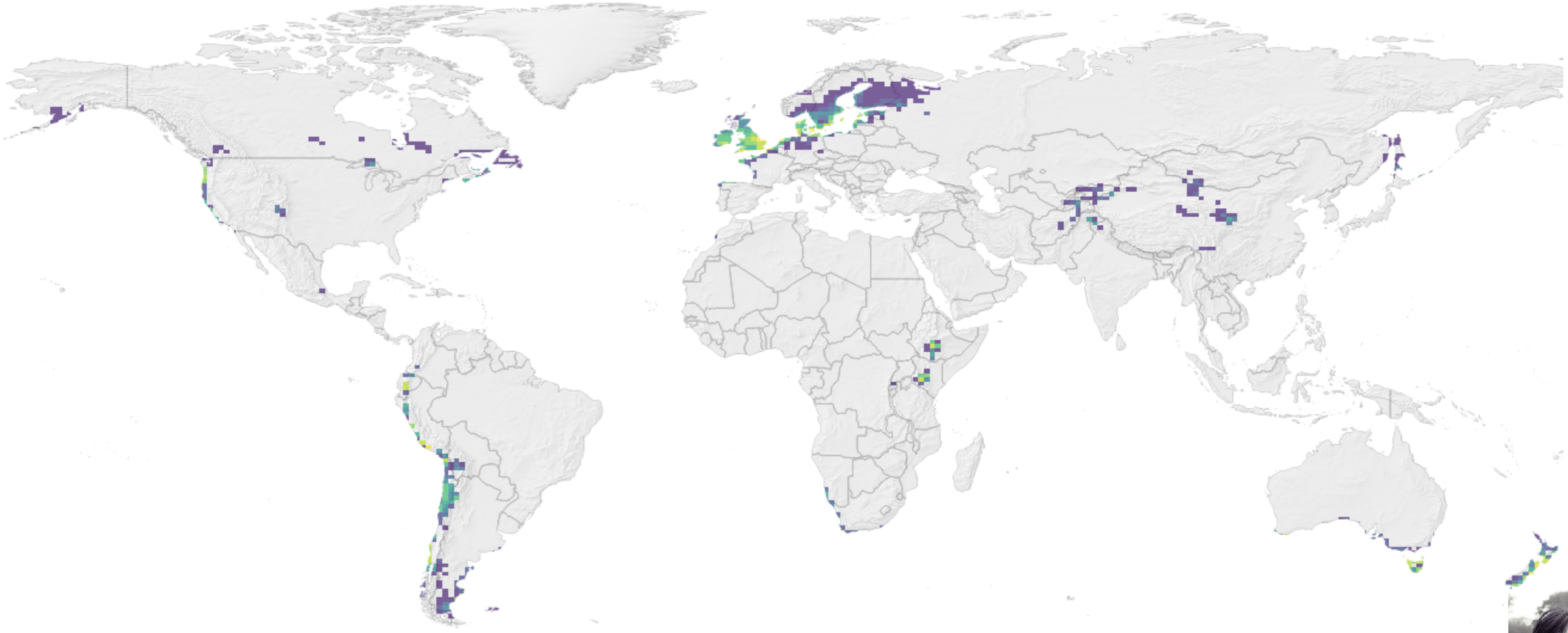


Cultivar diversity 2ºC

1 11

Morales-Castilla *et al. PNAS,* 2020

Future predicted regions at 4°C



Cultivar diversity 4°C

1 11

Morales-Castilla *et al. PNAS,* 2020

Future predicted regions at 2-4°C

Including variety diversity more than halved projected losses of current winegrowing areas: from 56% to 24% with 2°C warming

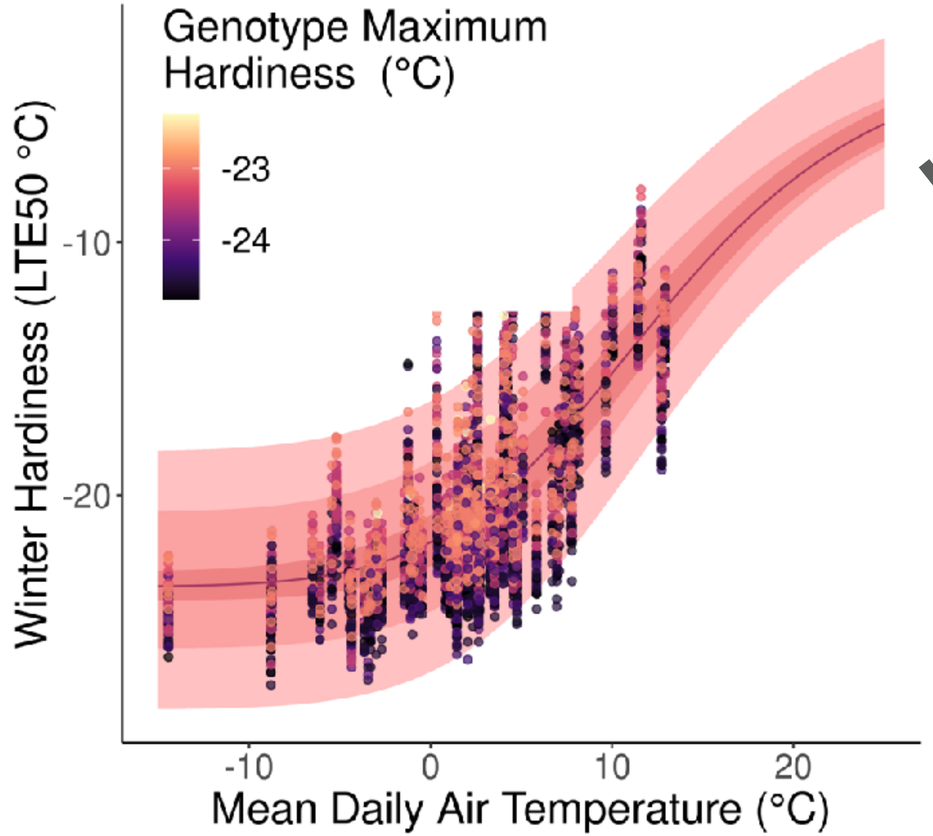
Cultivar diversity 4°C

1 11

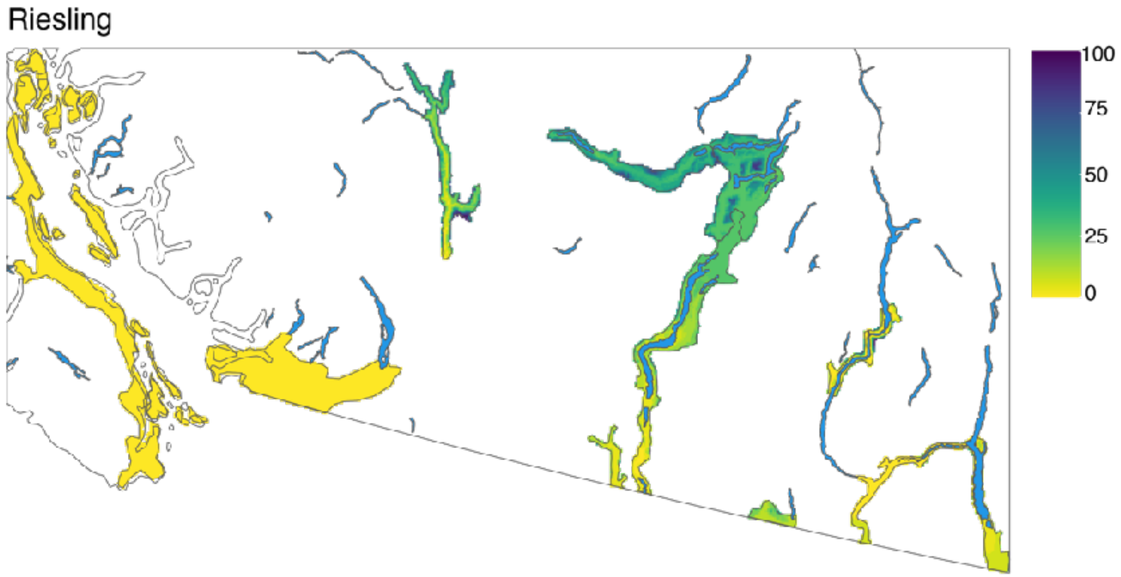
Simplified hardiness: 2 days <20°C or 1 day <30°C

Morales-Castilla *et al. PNAS,* 2020

Better models: Hardiness in the Okanagan

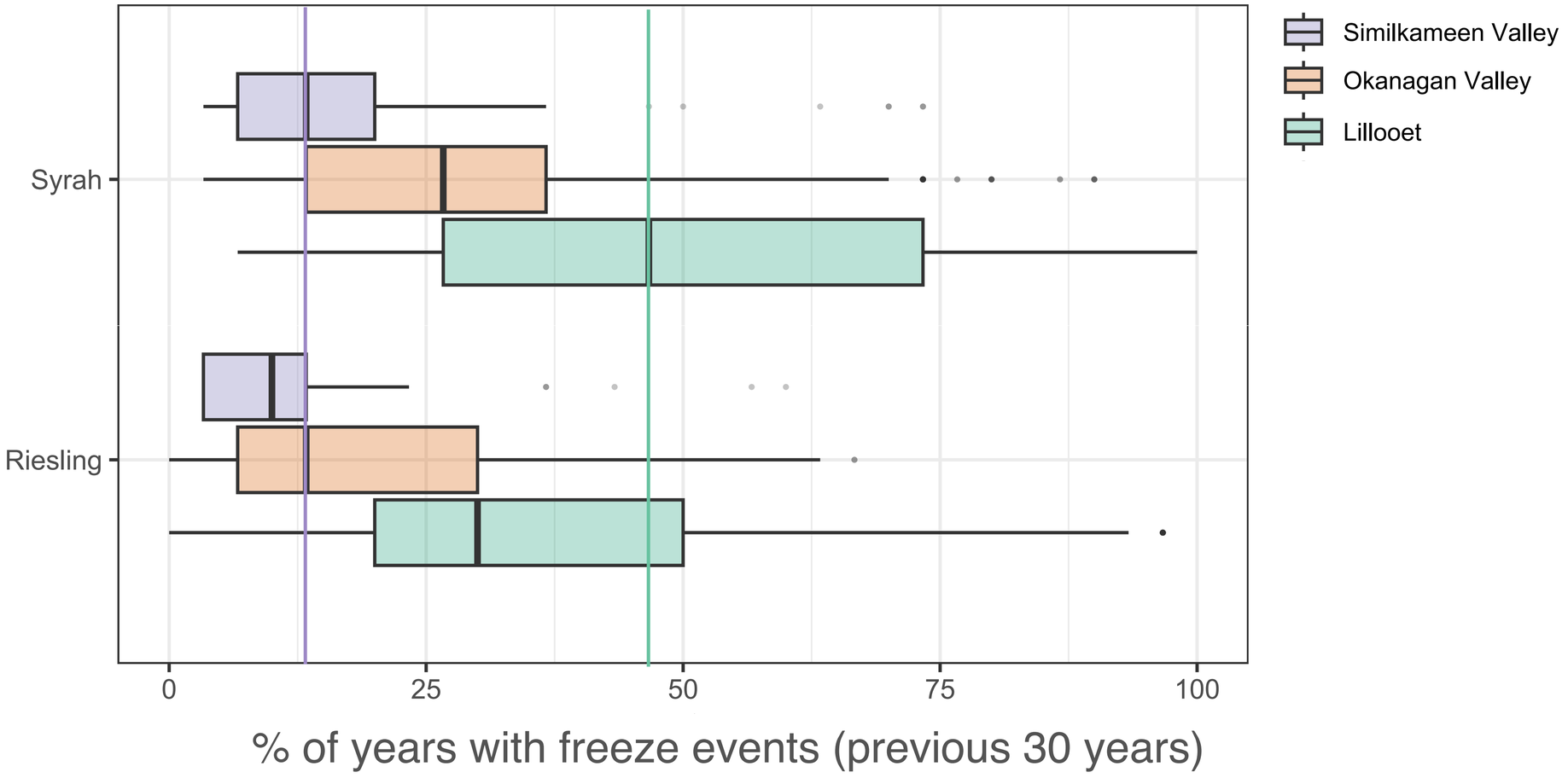


Translate models into freeze risk
Based on historical data

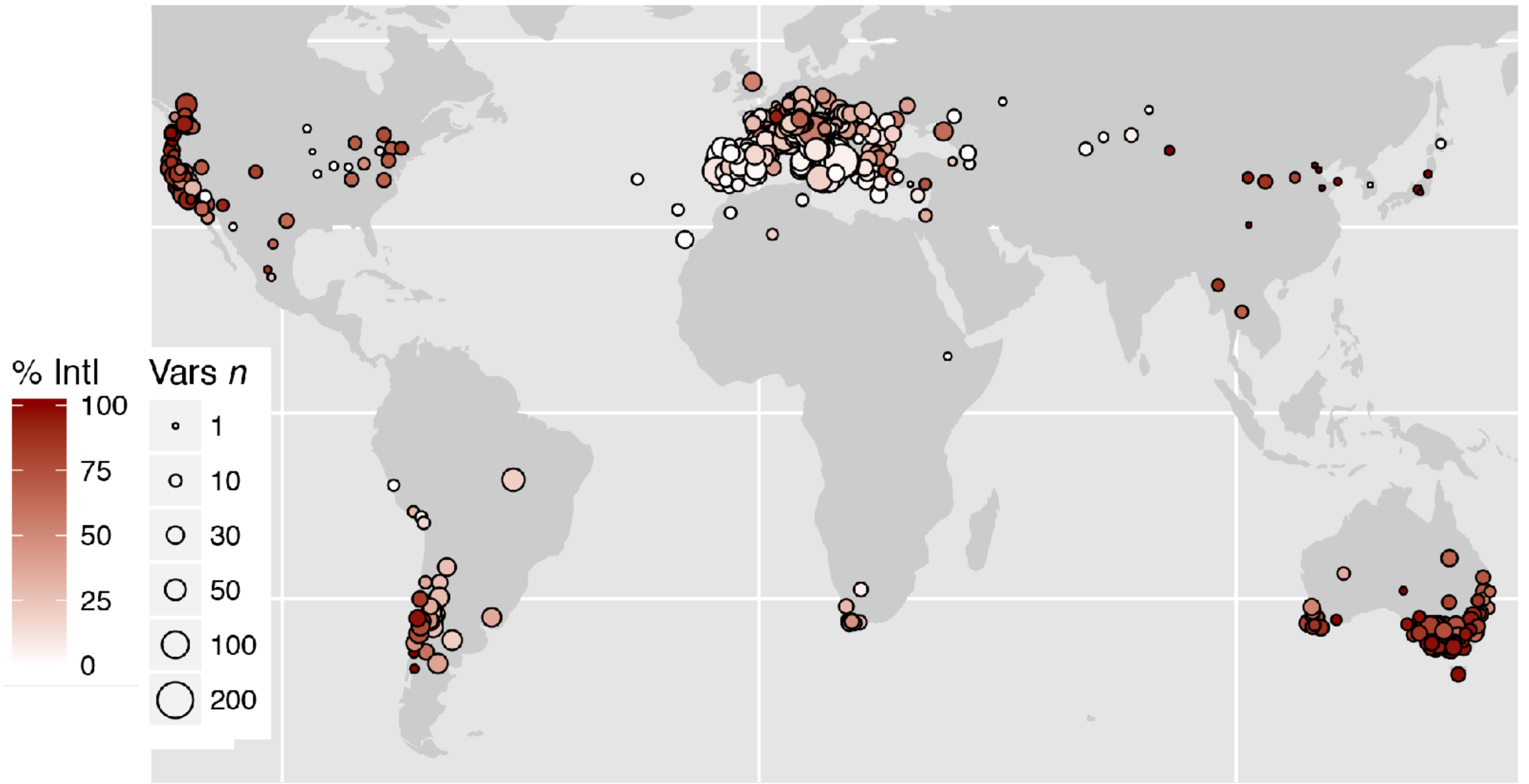


Jones, Bogdanoff & Wolkovich, *Am. Jour. of Botany,* 2023

Model freeze days across regions



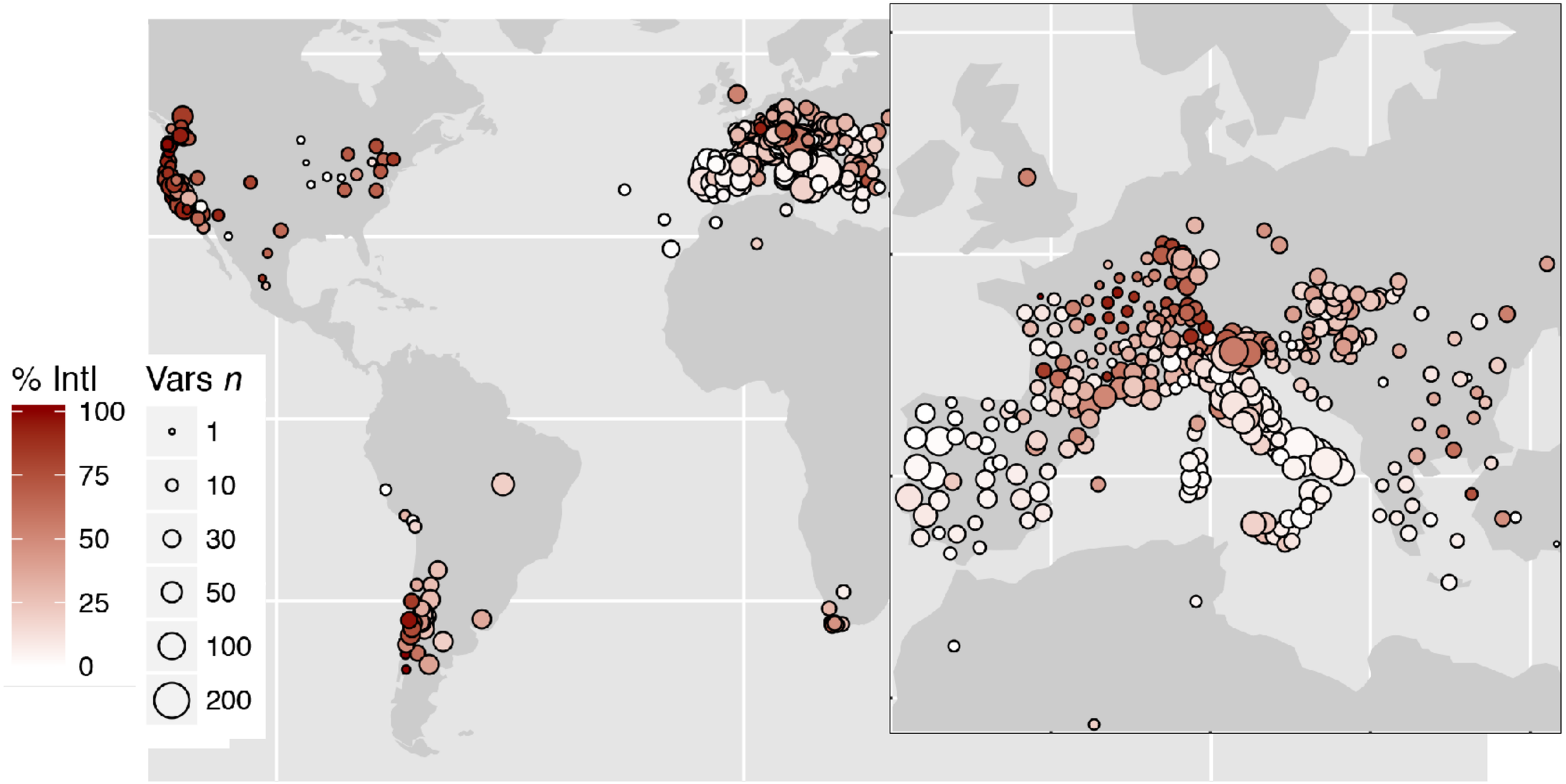
Most diversity under-exploited



International:
Cabernet-Sauvignon
Chardonnay
Merlot
Pinot noir
Syrah
Sauvignon blanc
Riesling
Muscat blanc
Gewürztraminer
Viognier
Pinot blanc
Pinot gris

Wolkovich *et al. Nature Climate Change*, 2018

Except in Old World regions



Wolkovich *et al. Nature Climate Change*, 2018

Climate & variety suitability

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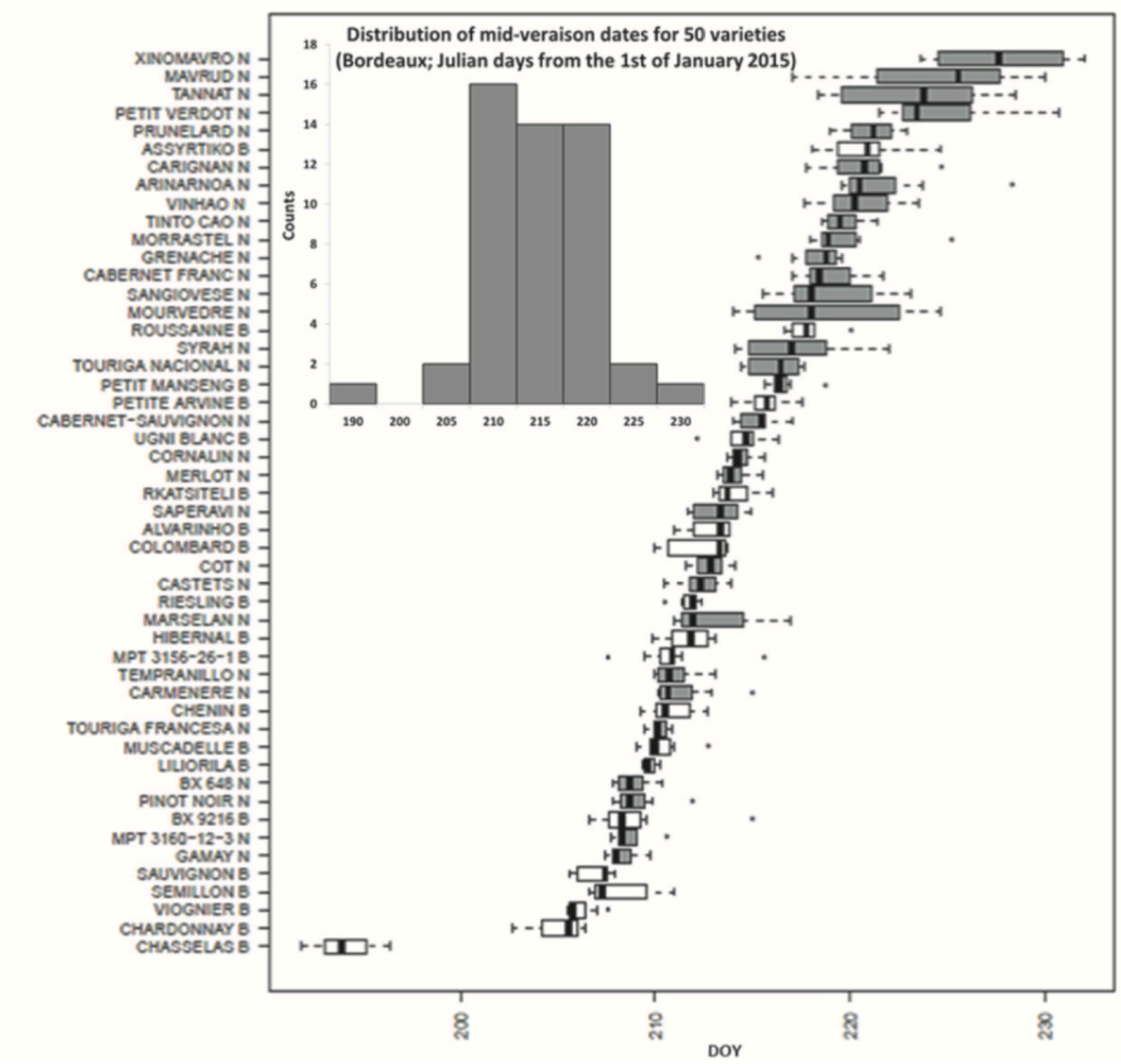
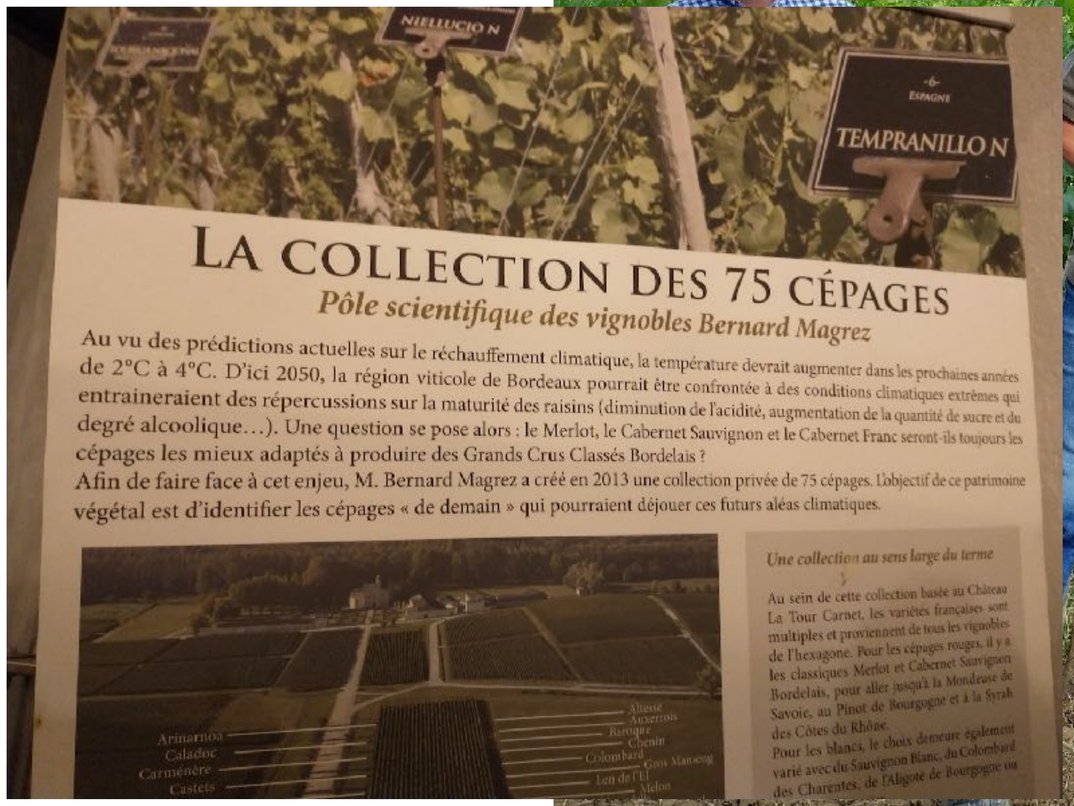
VitAdapt



García de Cortázar-Atauri *et al.* 2017

VitAdapt today: Trials in vineyards



QANOPEE (QuArt NOrd-Est PrÉmultiplication collectivE)

QANOPÉE

Beaujolais
NOUVELLE GÉNÉRATION
INTER BEAUJOLAIS

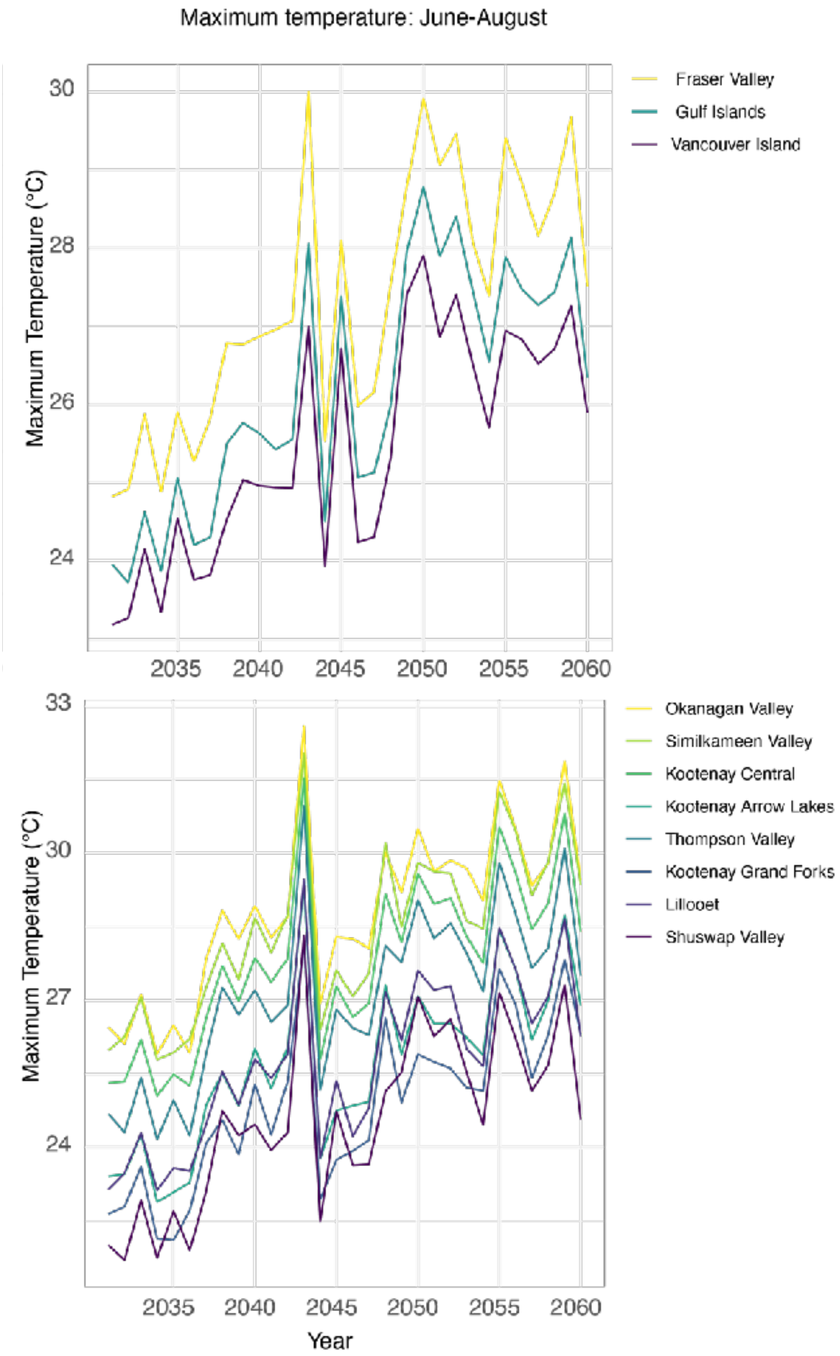
COMITÉ CHAMPAGNE

BOURGOGNE
Bureau Interprofessionnel des Vins de Bourgogne

- Champagne, Burgundy and Beaujolais joint investment in trialing new varieties (in greenhouses) for their regions

Understanding a region's future climate for trials

- Require high quality projection data
- Decisions on wine style and priorities
- Understanding and coping with uncertainty, especially for precipitation and possibly for temperature extremes



Thanks

stateofwine.org

Lab (not shown): Mira Garner, Faith Jones, Geoff Legault, April Maholvic, Isidora de Silva

Collaborators: Ben Cook, Kees Van Leeuwen, Kim Nicholas, Amber Parker, Andy Walker, Jordan Guthrie & Ed Tonner (Quails' Gate), Steph Vickers, Devin Methven & Rob Church (Sebastian Farms), Mike Watson & Carl Van der Merwe (Arterra)

Thierry Lacombe

Ignacio Morales-Castilla & Iñaki García de Cortazar Atuari

Pat Bowen & Carl Bogdanoff

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