

# Novel Climates of British Columbia

Emergence of new biogeoclimatic units in the 21<sup>st</sup> century

Forest Genetics Council ITAC Extension Meeting  
January 31<sup>st</sup>, 2018

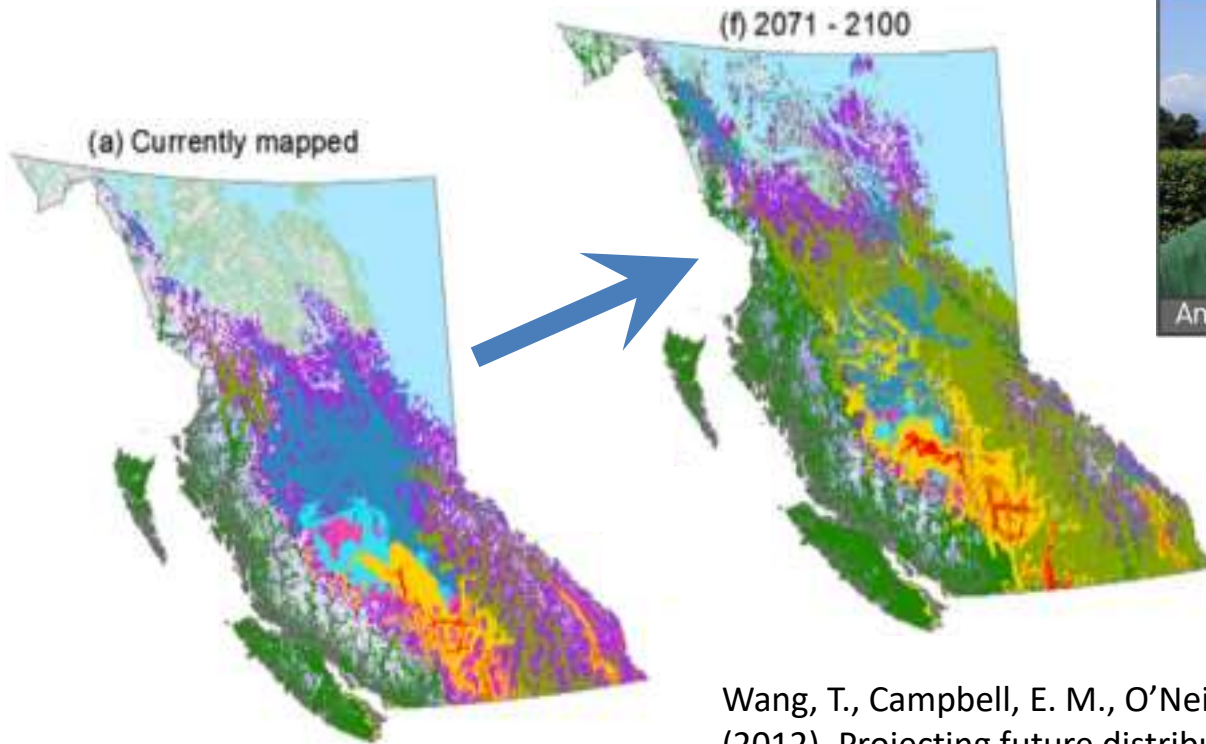
**Colin Mahony**

Department of Forest and Conservation Sciences, University of British Columbia



a place of mind  
THE UNIVERSITY OF BRITISH COLUMBIA

## BGC unit projections (“Flying BEC”)



Wang, T., Campbell, E. M., O'Neill, G. A., & Aitken, S. N. (2012). Projecting future distributions of ecosystem climate niches: Uncertainties and management applications. *Forest Ecology and Management*, 279, 128–140.





Contents lists available at [ScienceDirect](#)

## Forest Ecology and Management

journal homepage: [www.elsevier.com/locate/foreco](http://www.elsevier.com/locate/foreco)

### Novel climates: Trajectories of climate change beyond the boundaries of British Columbia's forest management knowledge system

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# Novel climates of British Columbia

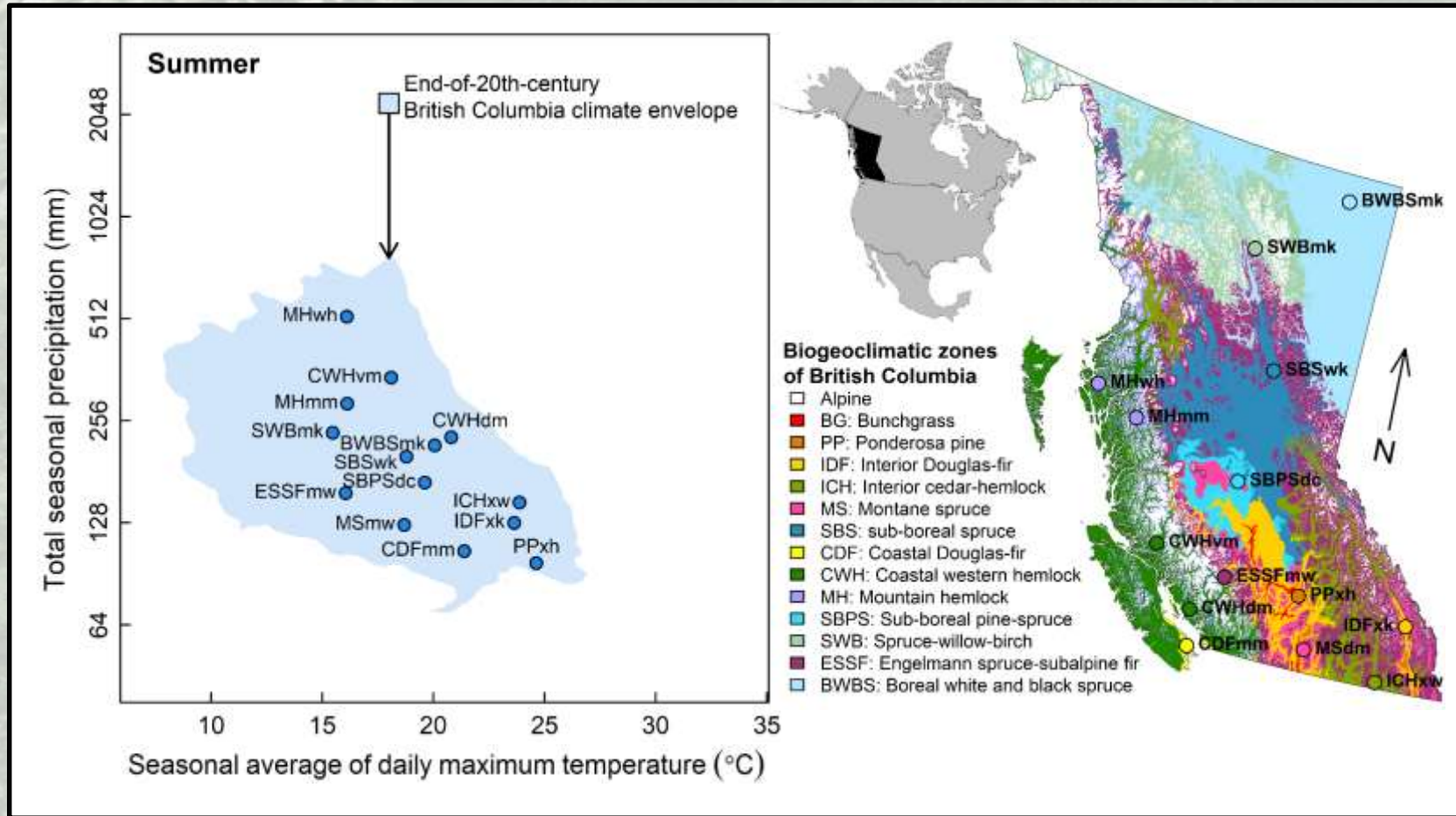
1. Shifting climates of BC
2. Preliminary assessment of novel climates
3. Detecting novel climates in Random Forest projections
4. North American analogs for BC's future climates



# Novel climates of British Columbia

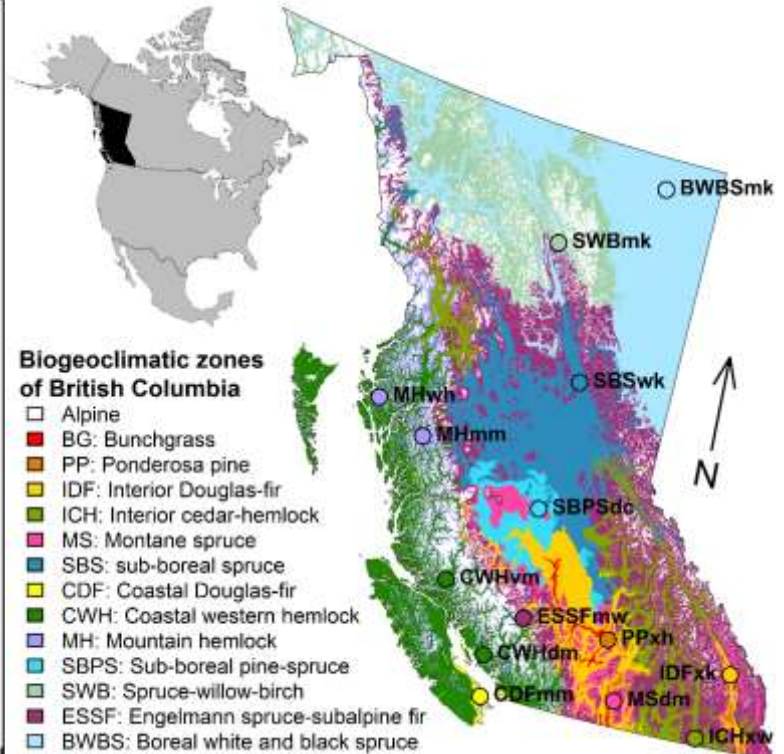
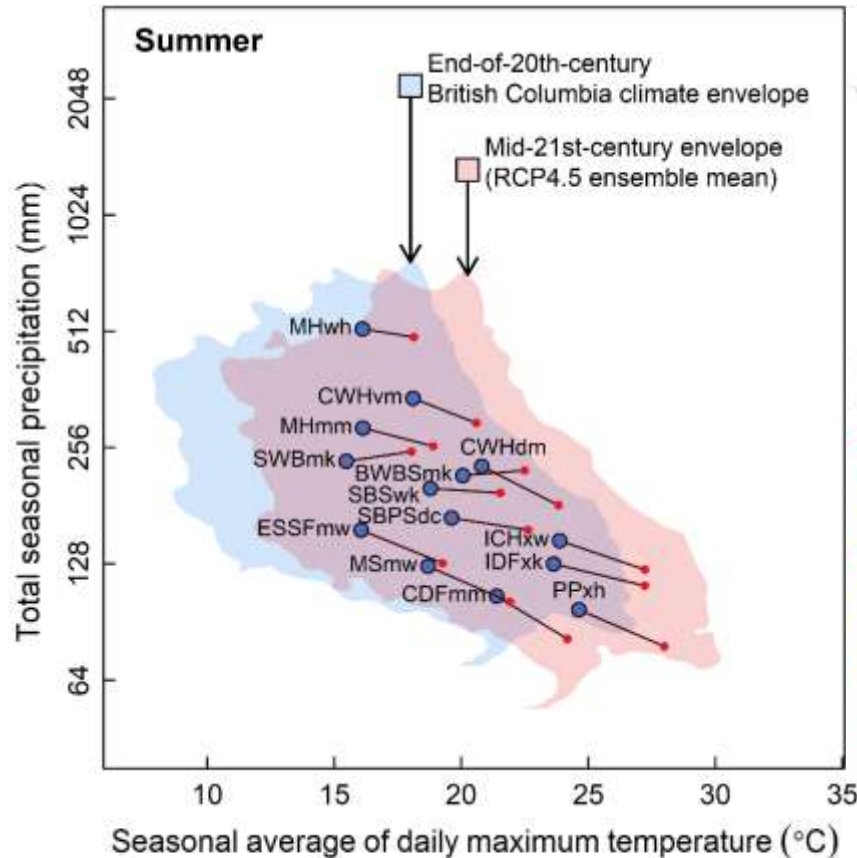
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# Shifting Climates of British Columbia

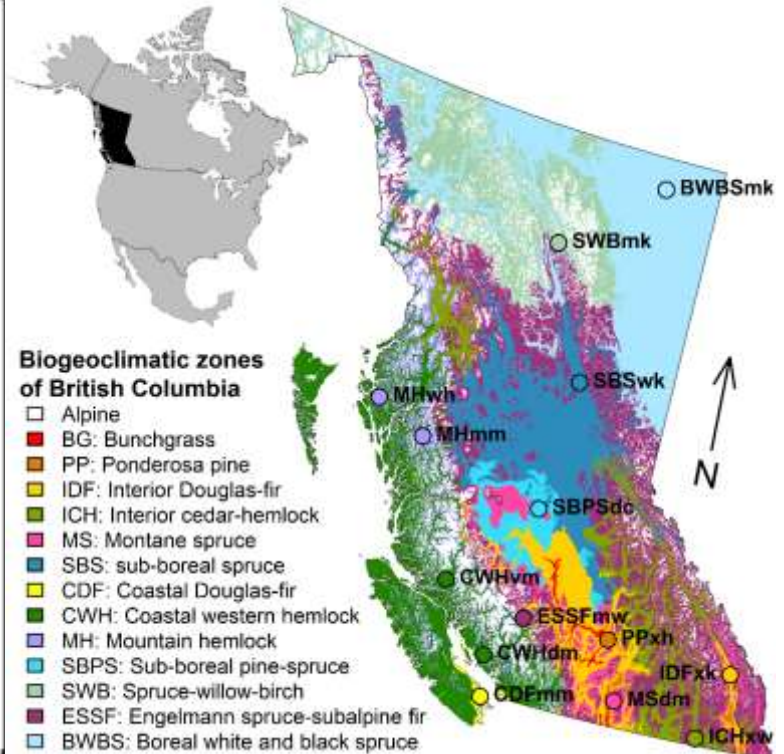
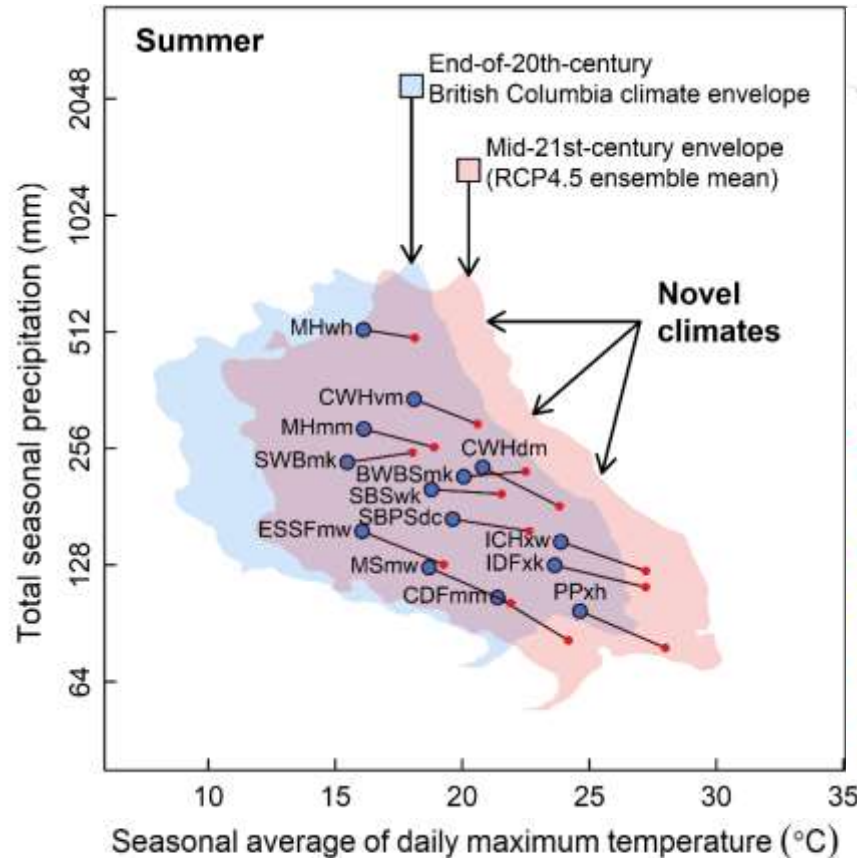




# Shifting Climates of British Columbia

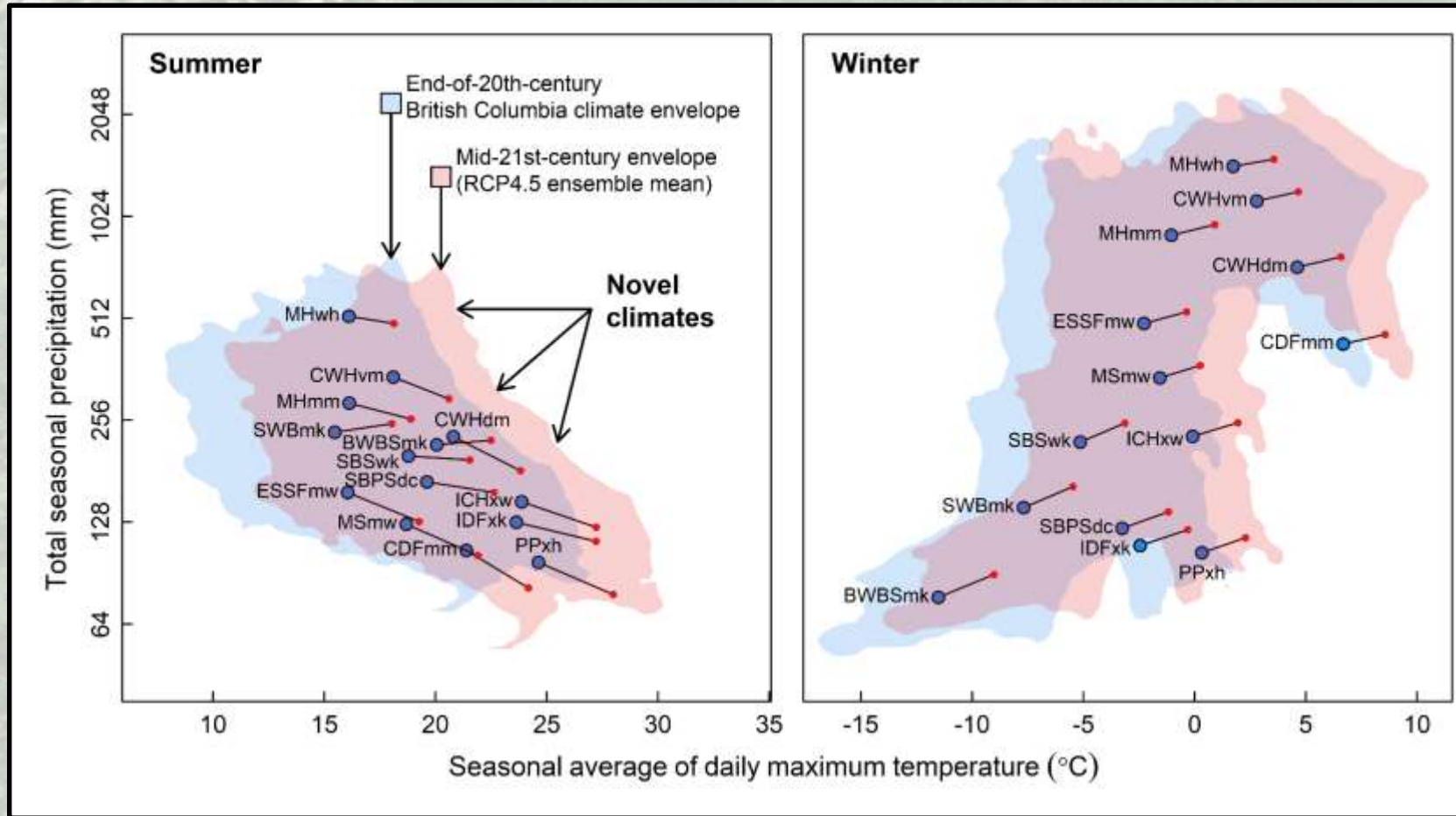


# Shifting Climates of British Columbia





# Shifting Climates of British Columbia



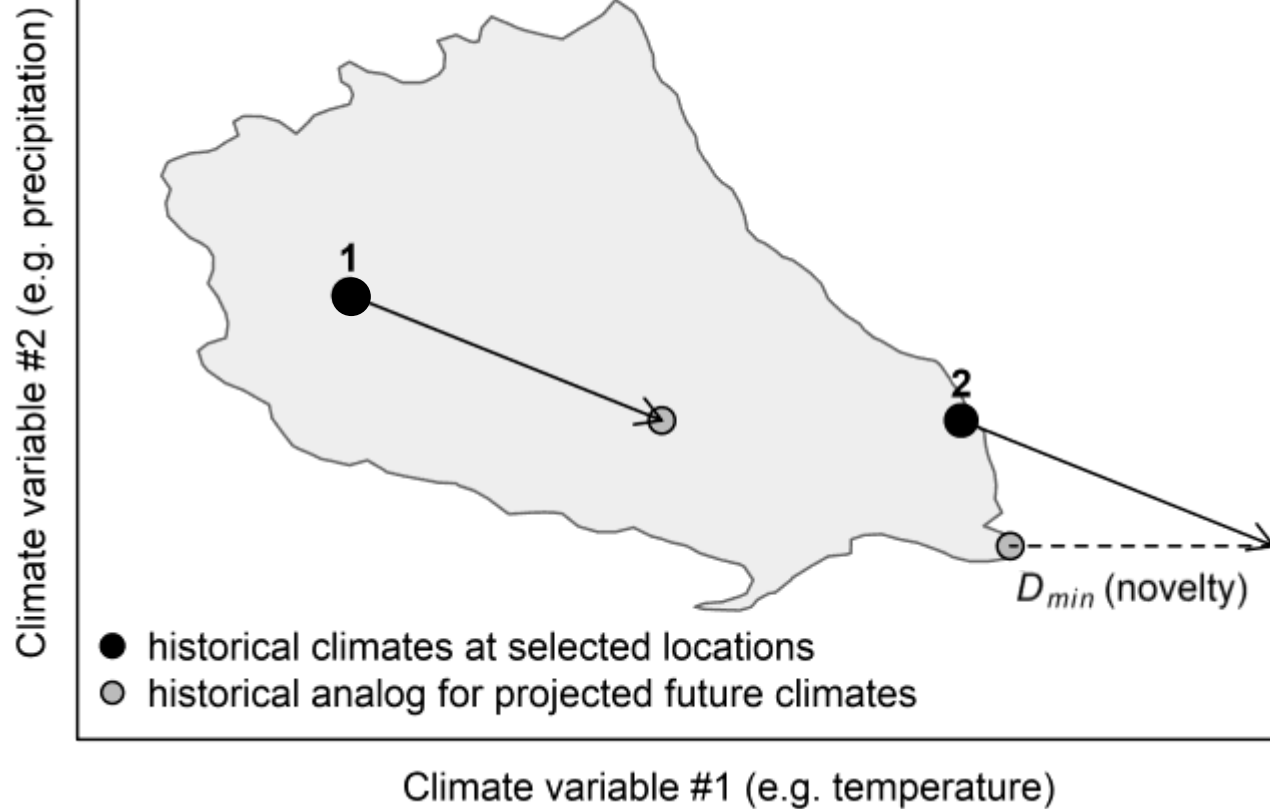
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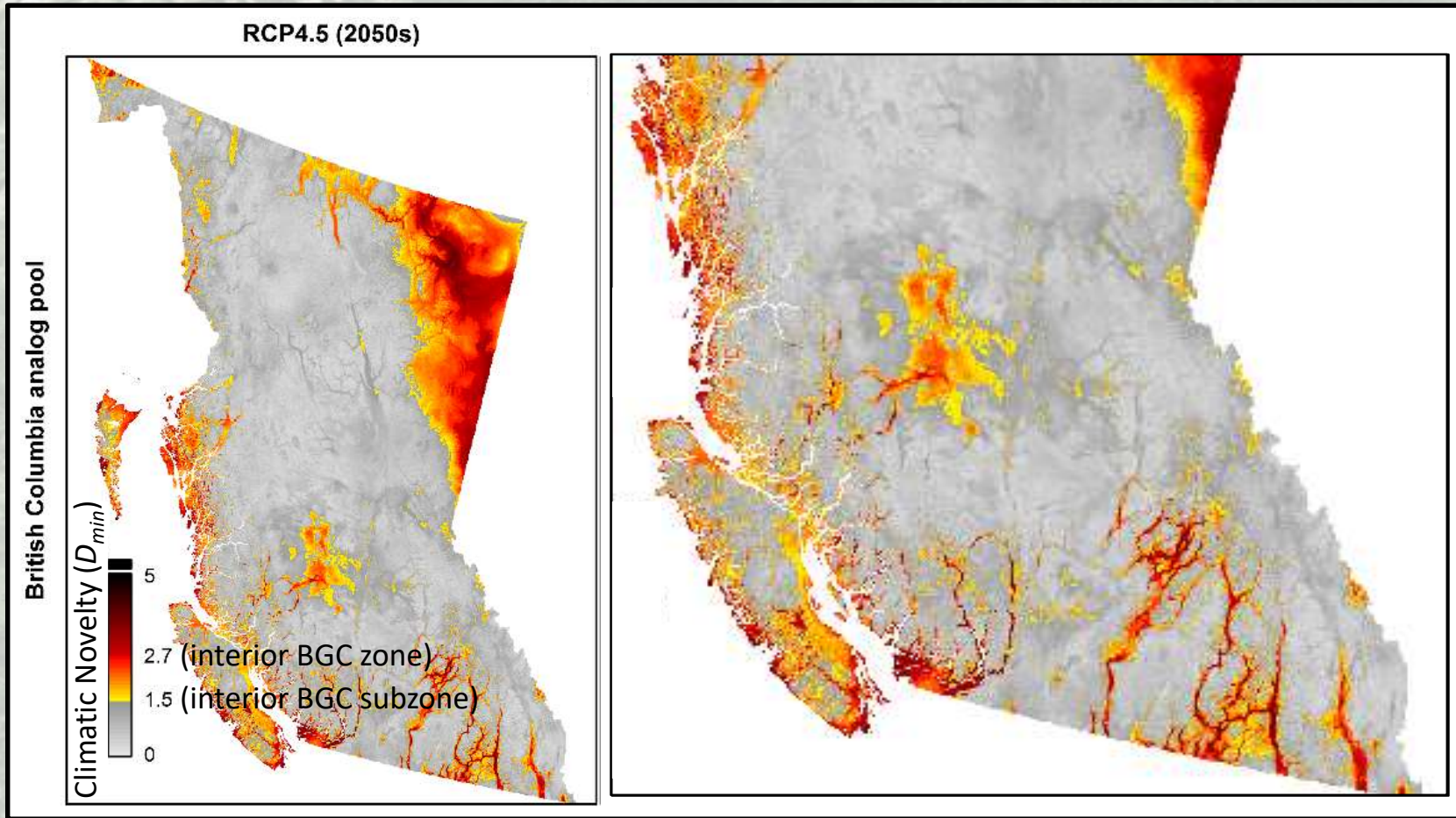
# The problem of novel climates

11



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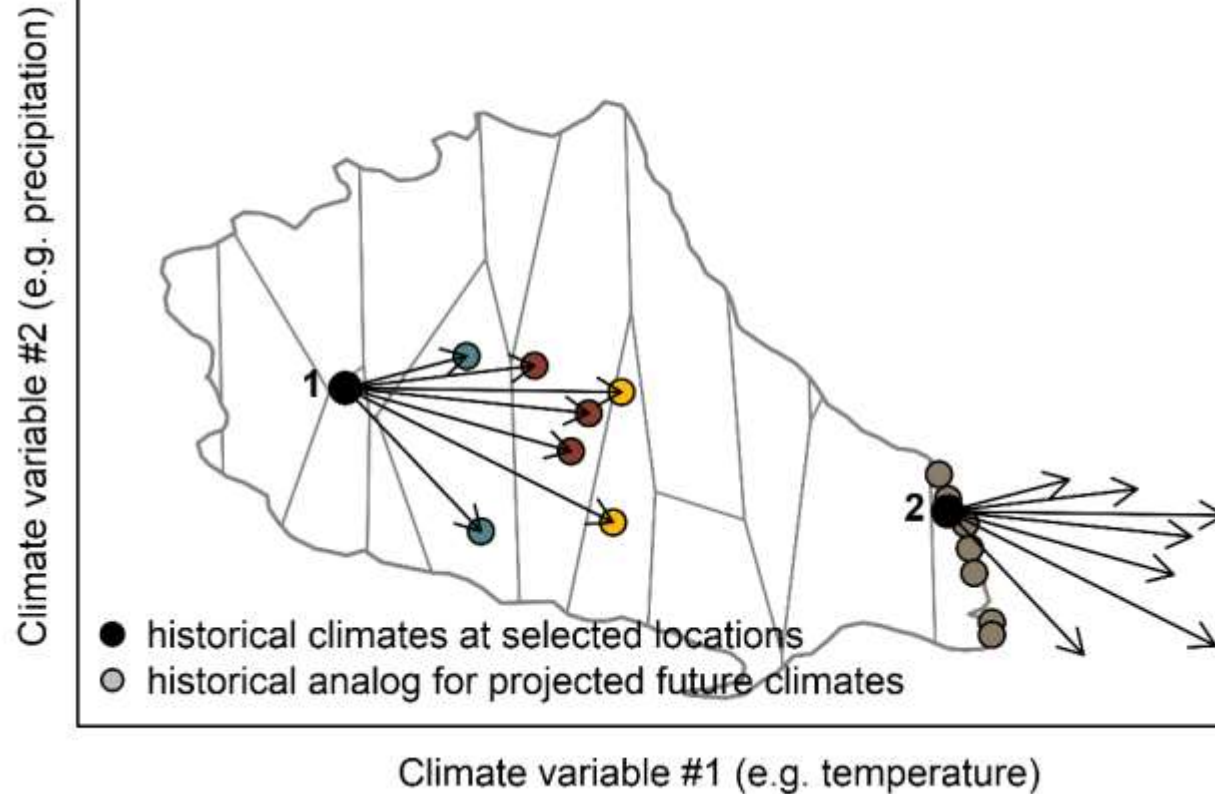
## Preliminary assessment of novel climates





# Novel climates of British Columbia

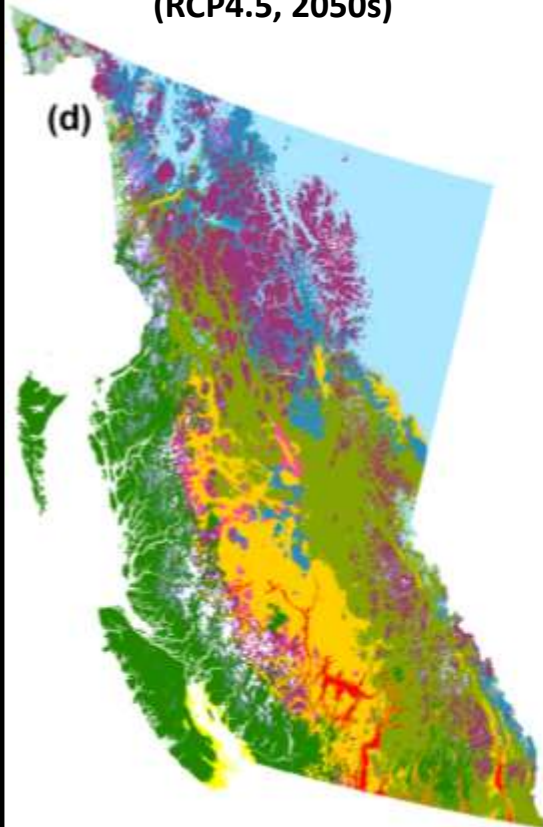
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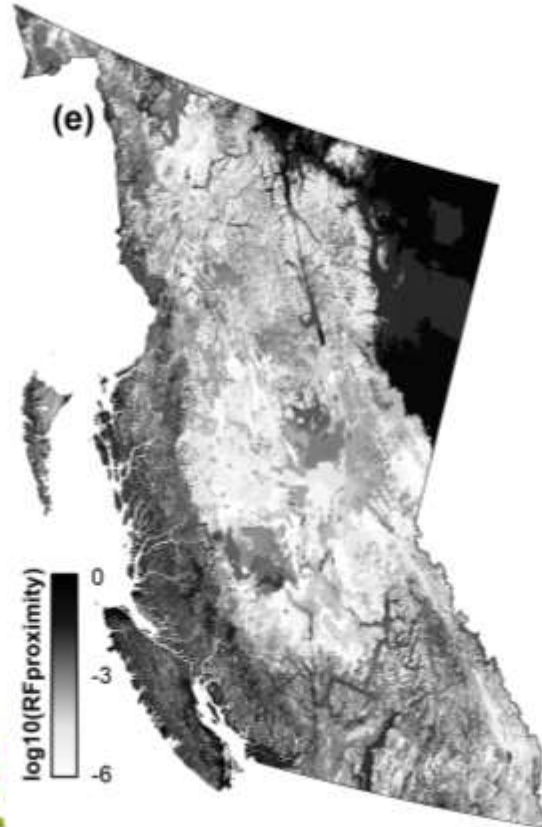


# Detecting novel climates in Random Forest projections

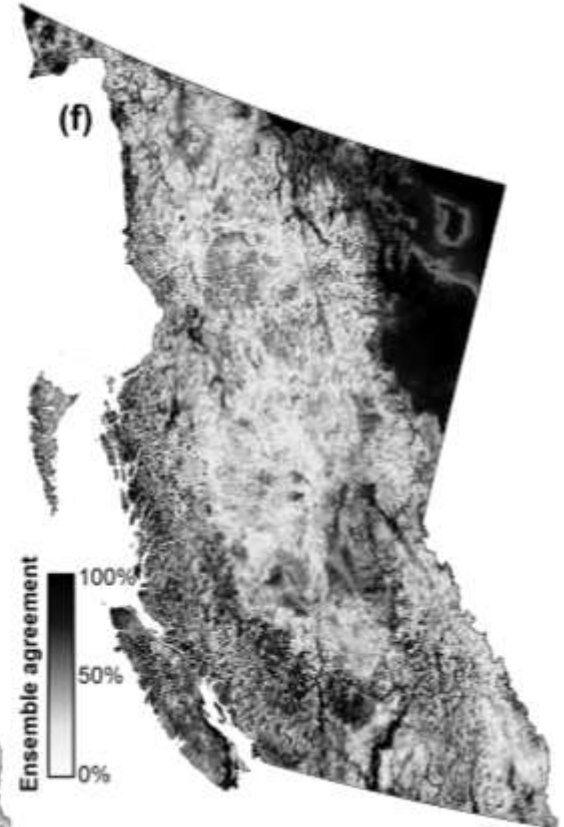
Random Forest BGC projection  
(RCP4.5, 2050s)



Analog similarity



Ensemble agreement

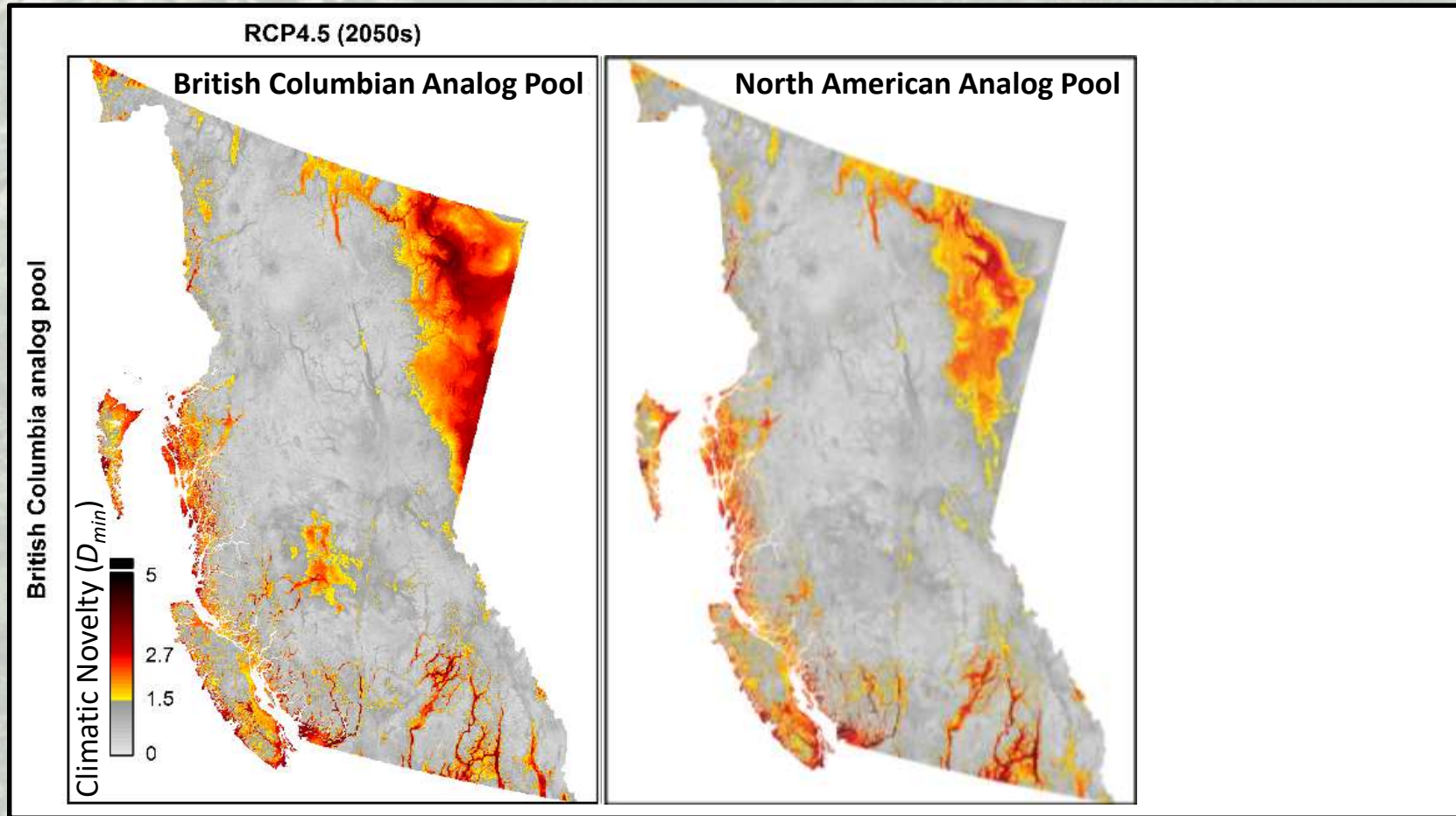


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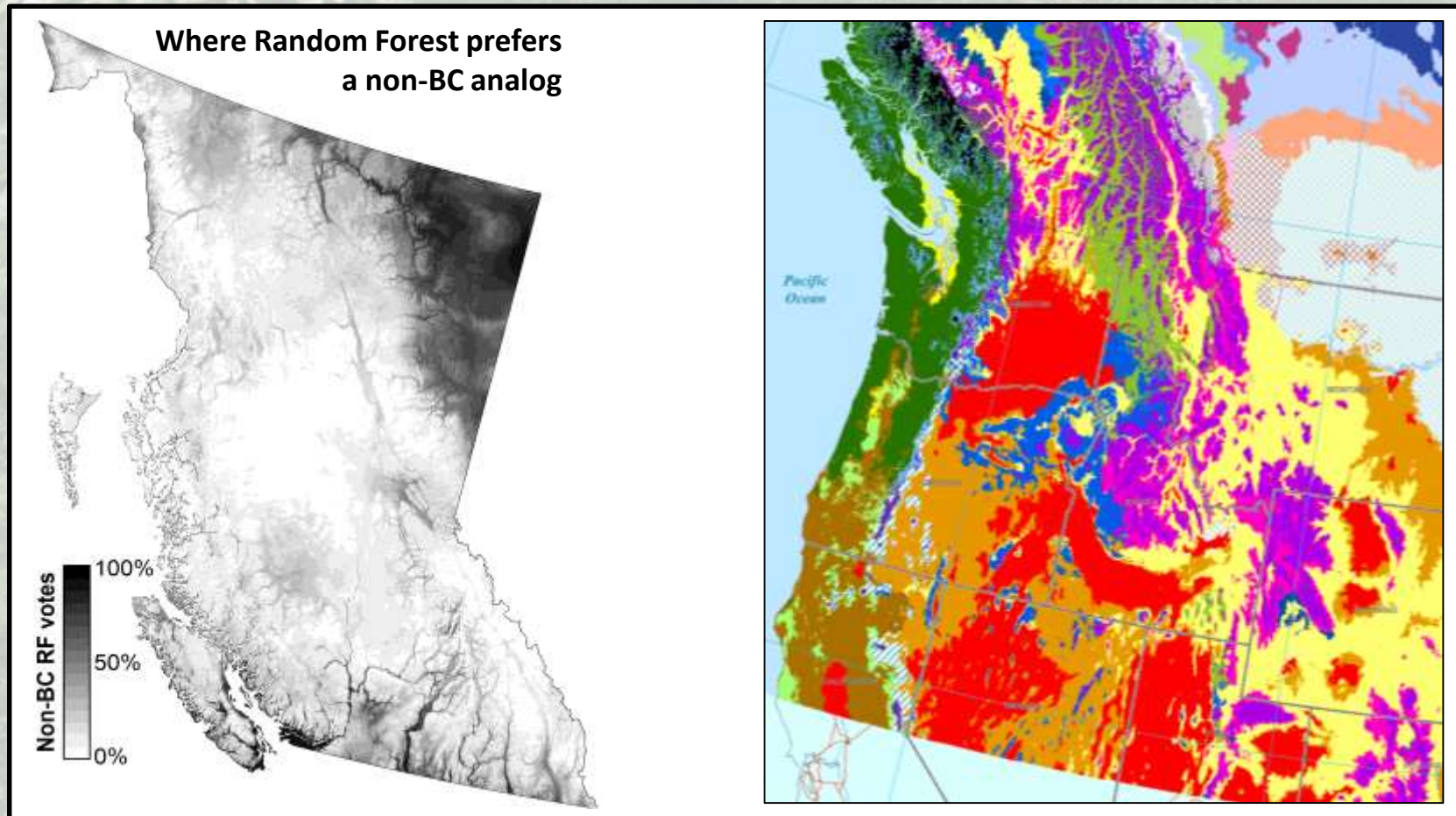
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## Preliminary assessment of novel climates



# Finding analogs for the future climates of British Columbia





### **Conclusions of BC novelty analysis**

1. Novel climates are an important source of error
2. Novel BGC subzones emerge by mid-century
3. Topographic position is a key driver of novelty
4. North American analogs available for some but not all of BC's novel climates

### **Next steps**

1. Novelty detection in Random Forest
2. BEC mapping in USA

## Ecological knowledge is climate-specific

