Jet Propulsion Laboratory
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Intrinsic Dimensionality and Spectral Diversity

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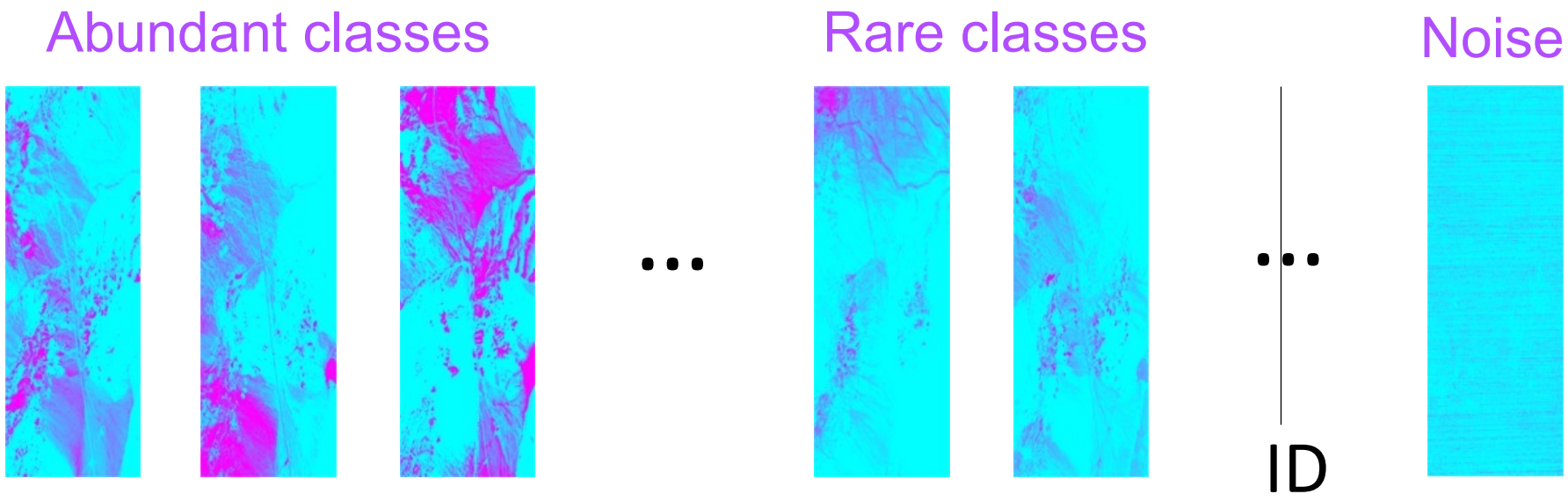
Intrinsic Dimensionality

Defined as the dimension of the signal subspace

The number of unique pieces of information (principal components)

Hypothesis that ID can be used as a metric for biodiversity.



The mathematical concept of intrinsic dimensionality provides a metric for spectral diversity that does not inherently require training data, making its development and validation important for the future of global biodiversity mapping.

SHIFT spatial ID vs. ET

Intrinsic Dimensionality (ID) for 1 km blocks, vs. the nearest ECOSTRESS DisALEXI Evapotranspiration (ET) over the SHIFT domain

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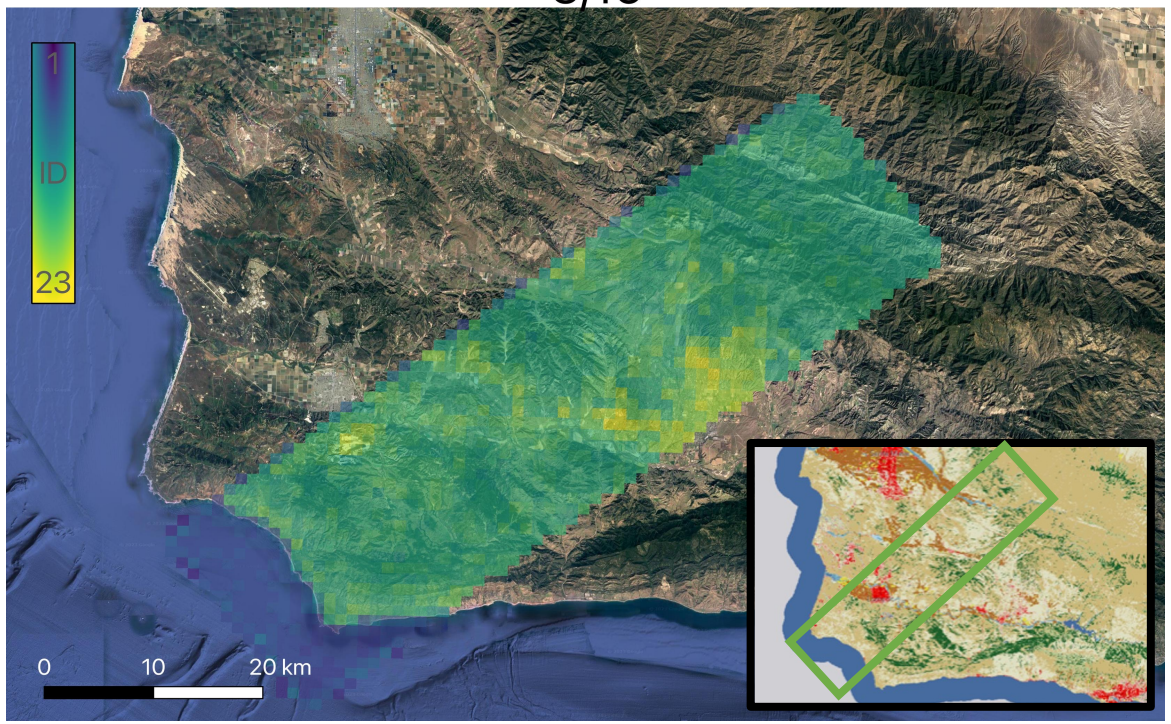

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ID more sensitive to “number of *things* in a cell” than seasonal effects

SHIFT spatial ID vs. ET

Intrinsic Dimensionality (ID) for 1 km blocks, vs. the nearest ECOSTRESS DisALEXI Evapotranspiration (ET) over the SHIFT domain

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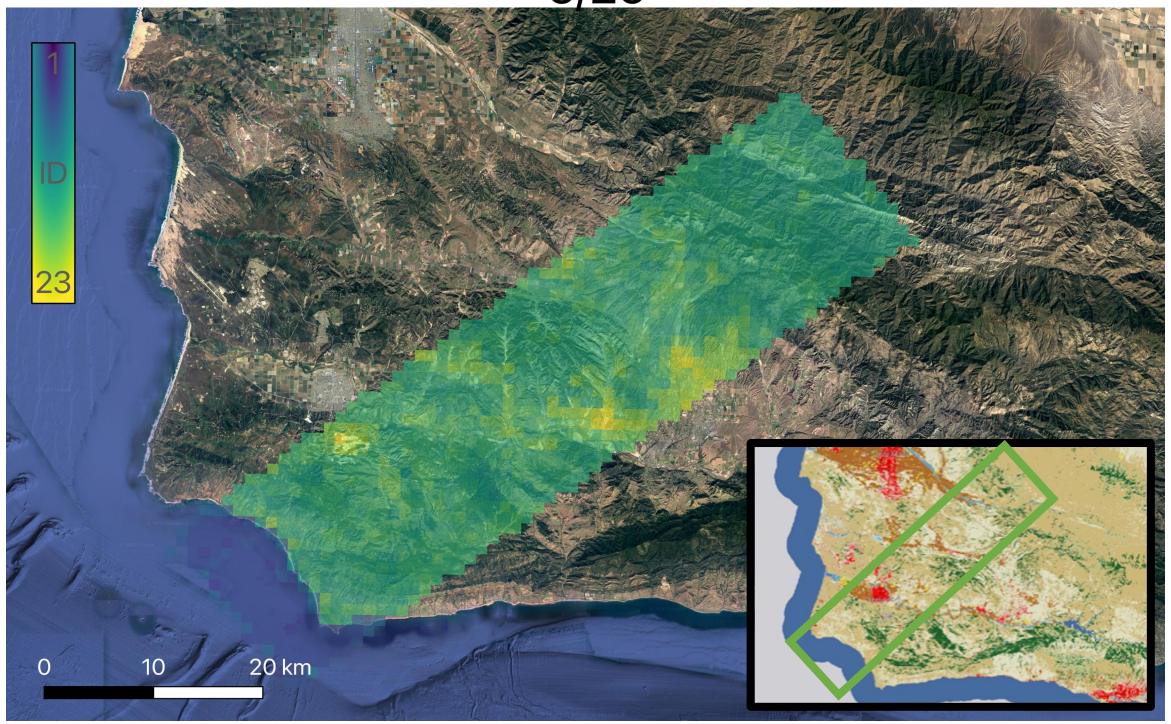

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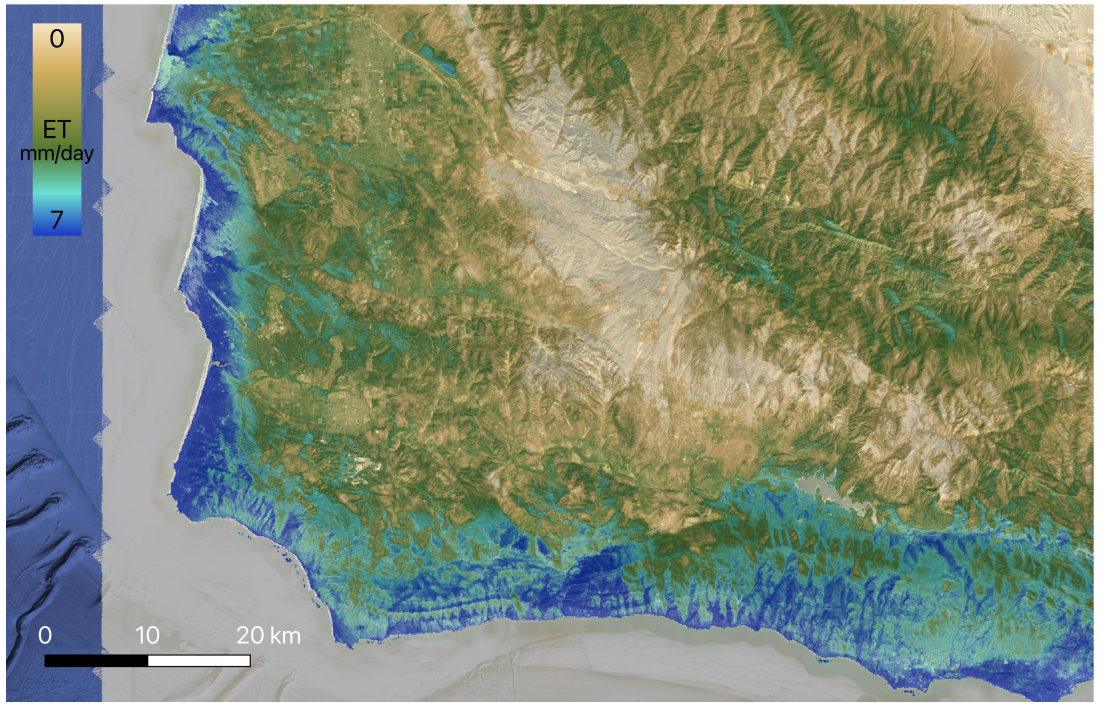
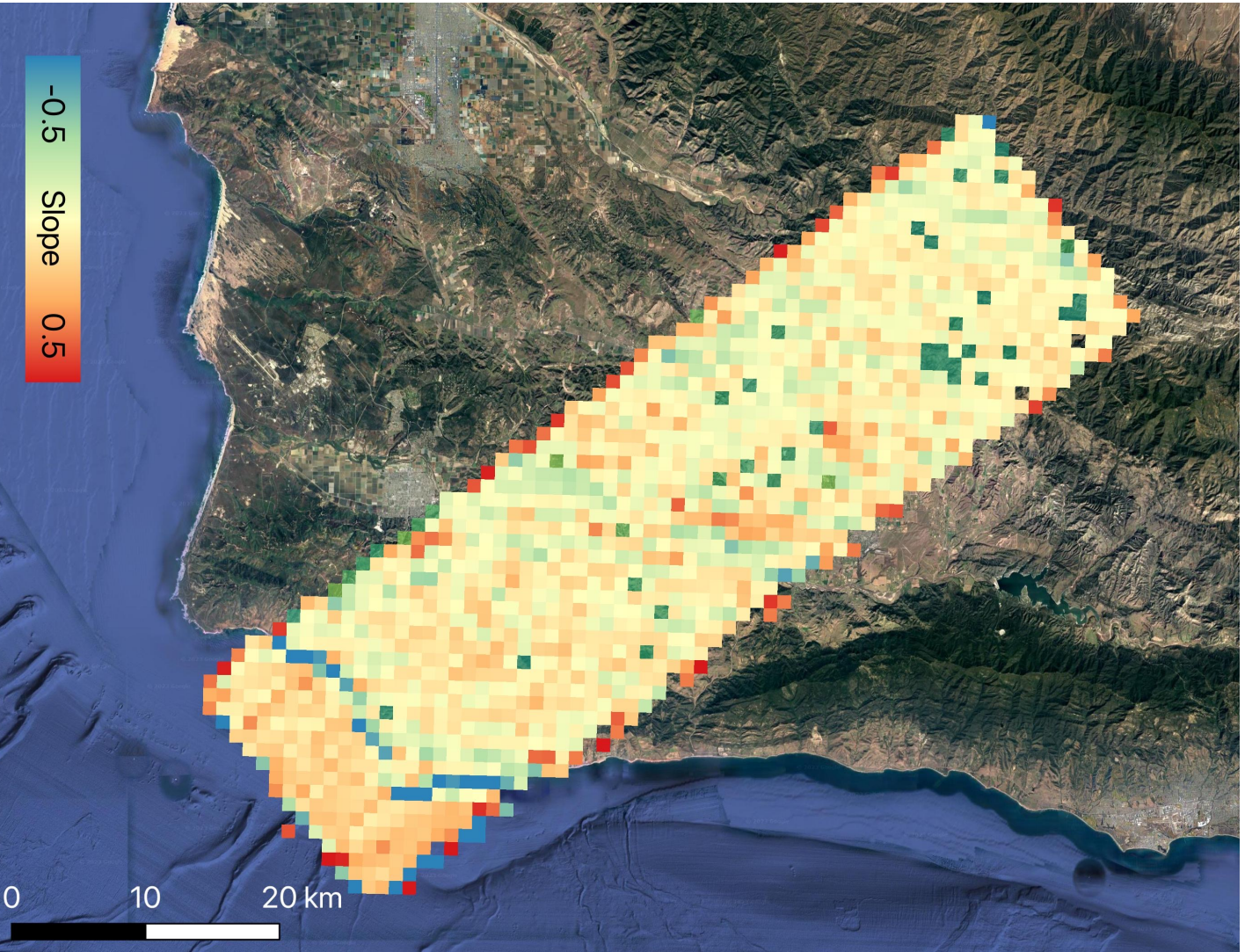
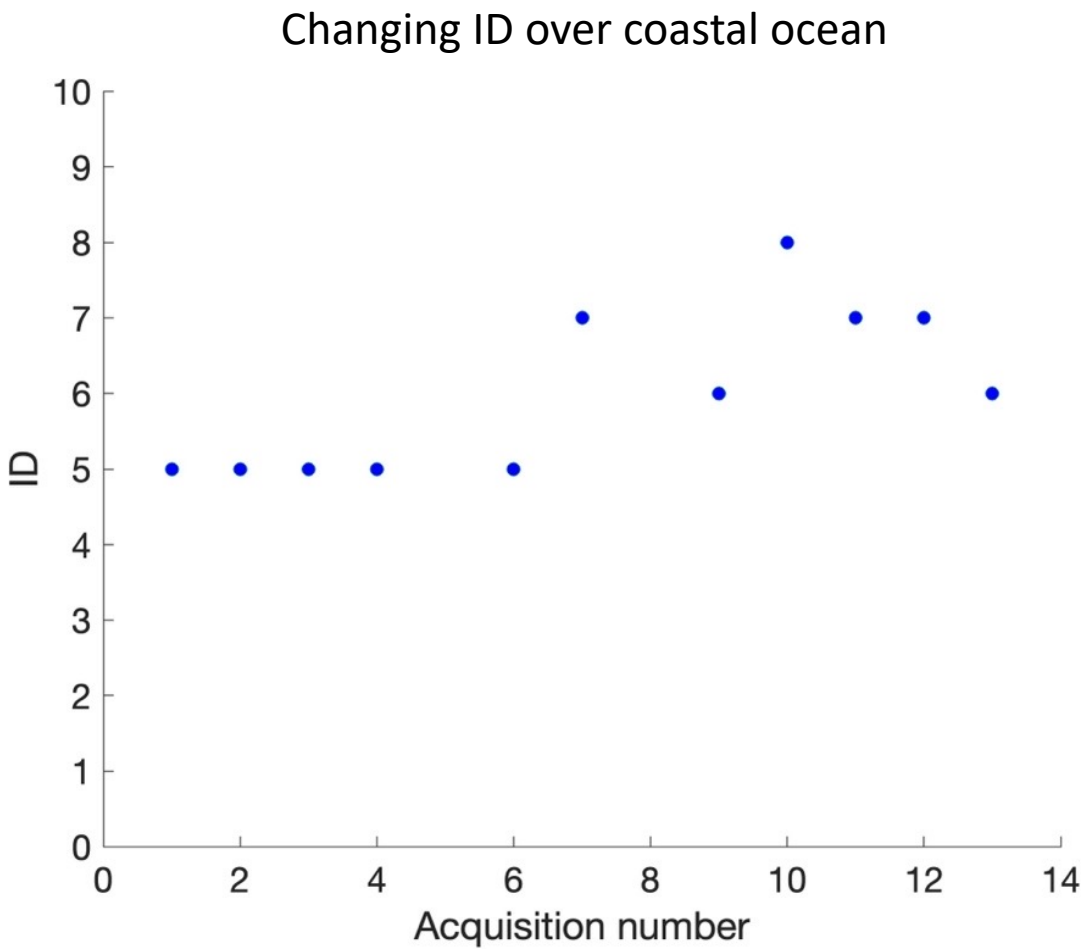


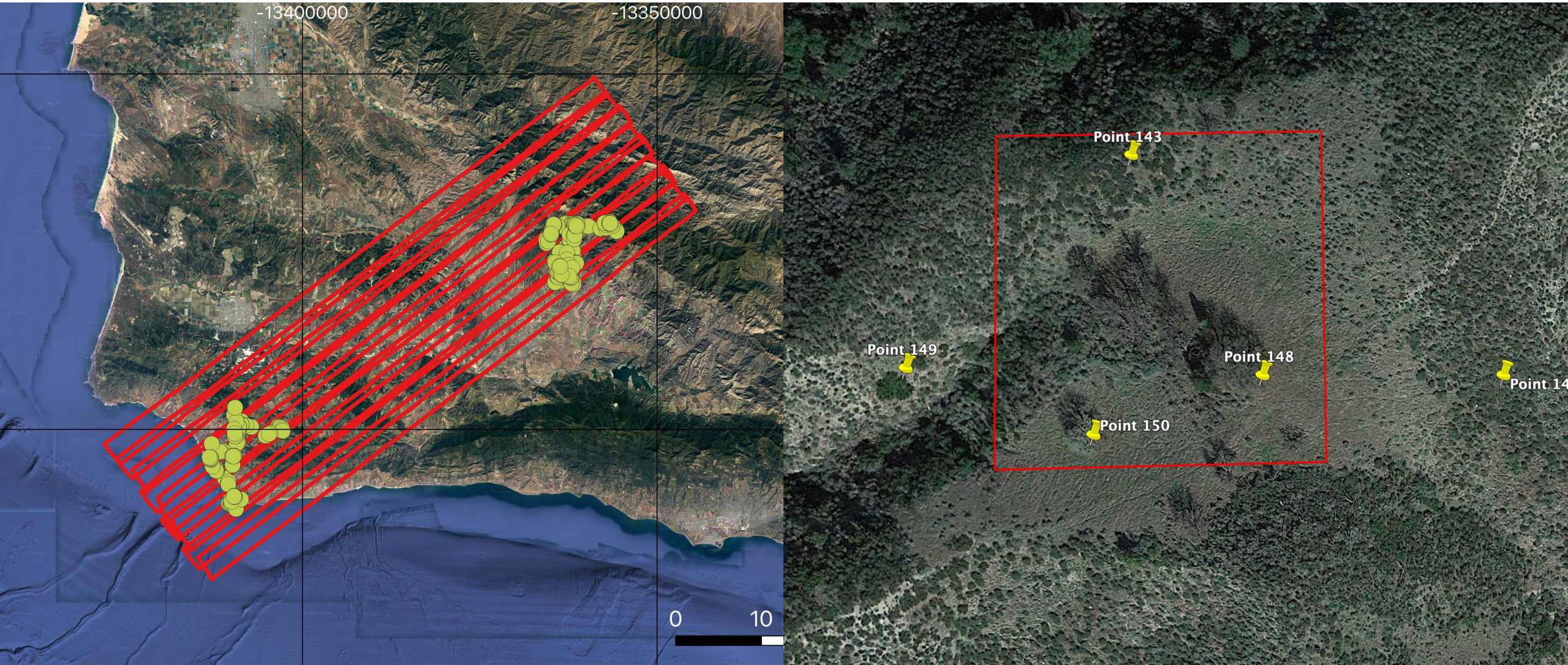
ID more sensitive to “number of *things* in a cell” than seasonal effects

SHIFT spatial ID is relatively stationary over Feb-May

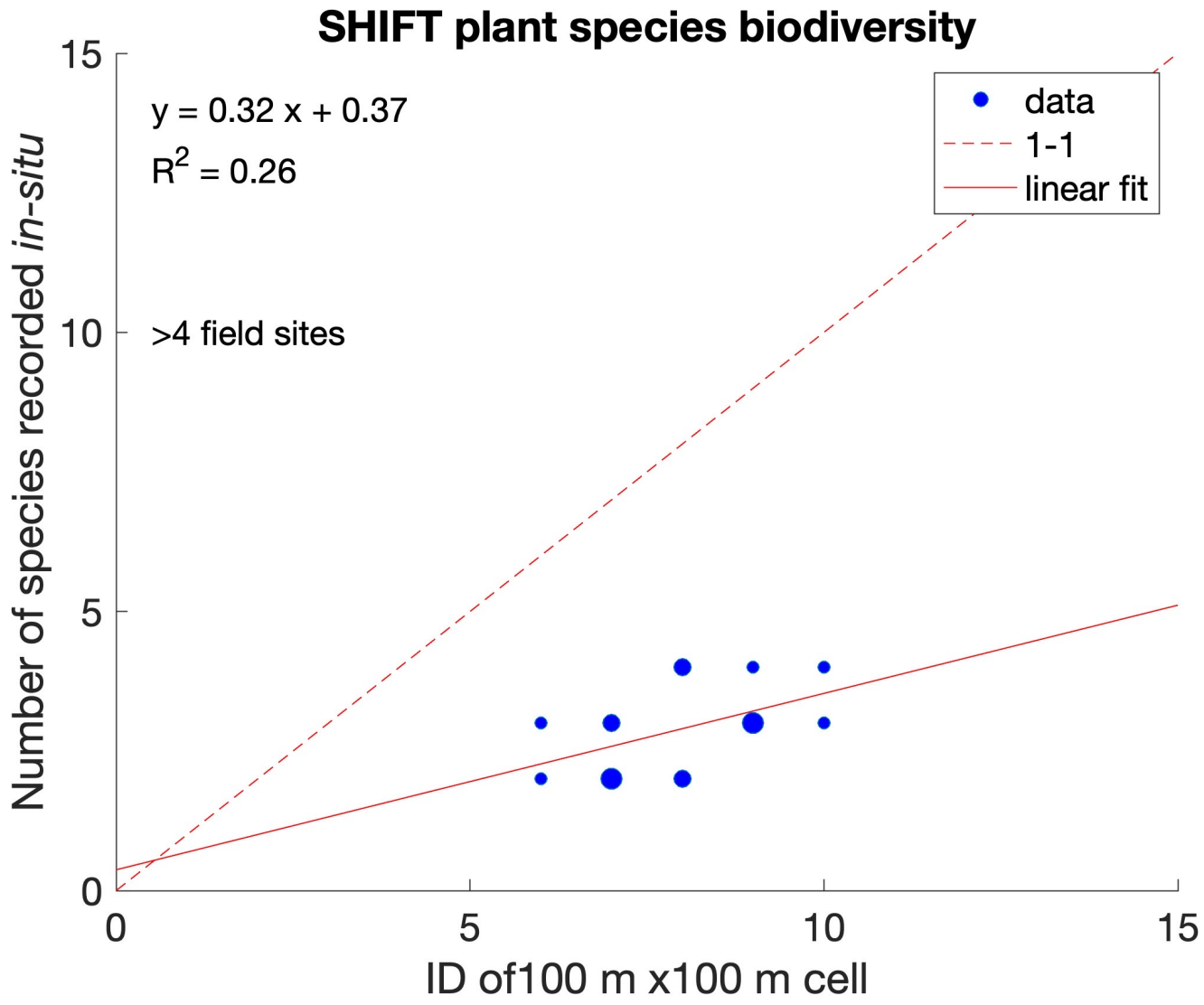




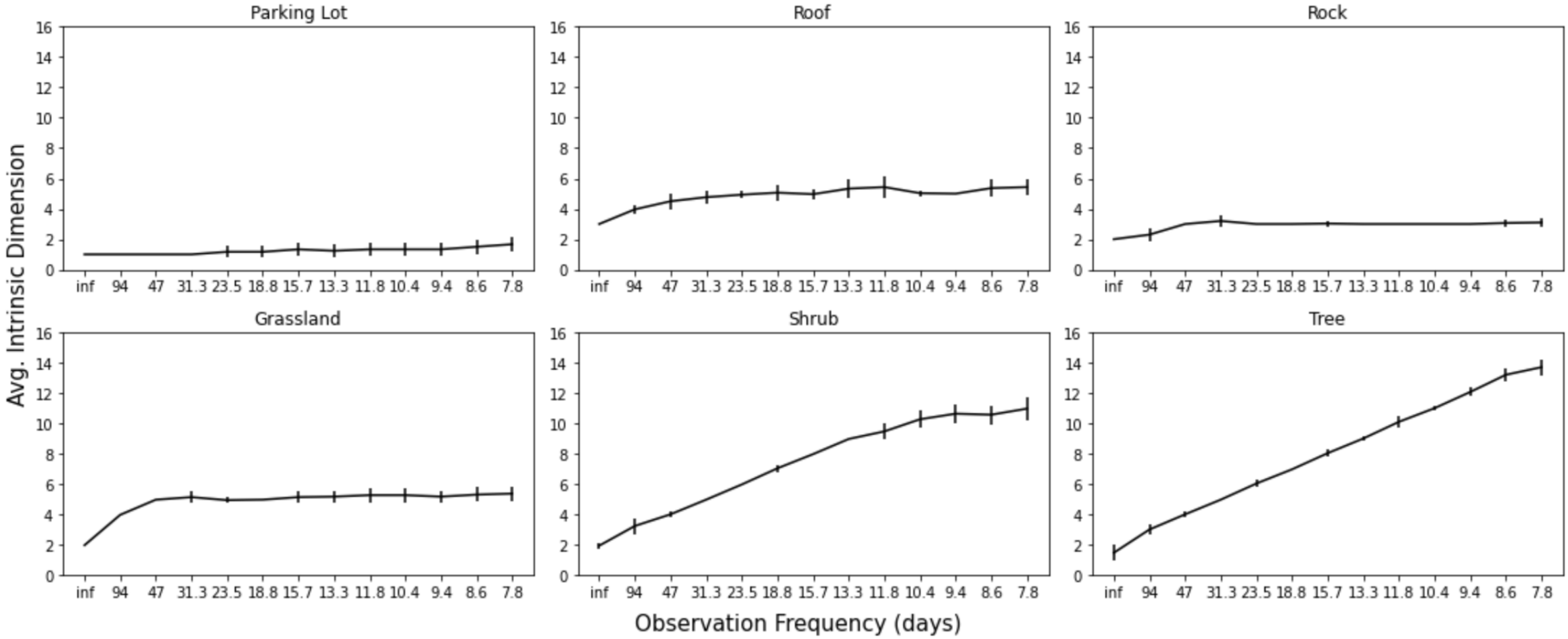
SHIFT spatial ID validation against small field sites



SHIFT ID validation is encouraging



Temporal ID: information gain when combining weekly observations



Credit: Michael Kiper

Bredasdorp
Baardskeerdersbos
Elim
Priority 1
Priority 2
Pearly Beach
Wolvengat
Agulhas National Park
Die Dam
Aasfontein
BioSCape Fieldwork 2023
Struis Bay
Hotagterklip
L'Agulhas

Fieldwork during the BioSCape Campaign 2023

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Next steps

APPLY SHIFT METHODOLOGY TO BIOSCAPE DATA

FIELD VALIDATION

IMPLEMENT BETA DIVERSITY METHODOLOGY

STUDY DRIVERS OF DIVERSITY

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