

Article

# At Which Overpass Time Do ECOSTRESS Observations Best Align with Crop Health and Water Rights?

Benjamin D. Goffin <sup>1,\*</sup>, Carlos Calvo Cortés-Monroy <sup>2</sup>, Fernando Neira-Román <sup>2</sup>, Diya D. Gupta <sup>3</sup>, and Venkataraman Lakshmi <sup>1</sup>

<sup>1</sup> Department of Civil and Environmental Engineering, University of Virginia, Charlottesville, VA 22904, USA

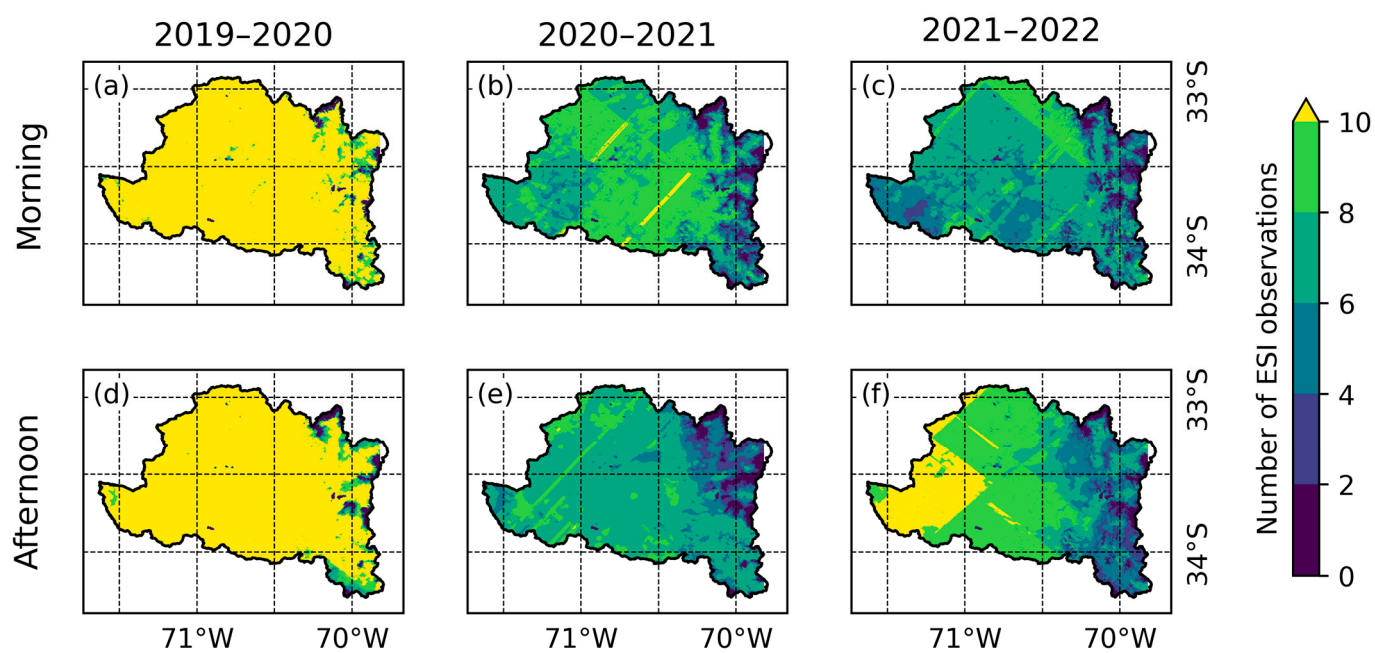
<sup>2</sup> Centro de Información de Recursos Naturales, Providencia, Región Metropolitana, Chile

<sup>3</sup> College of Arts and Sciences, University of Virginia, Charlottesville, VA 22904, USA

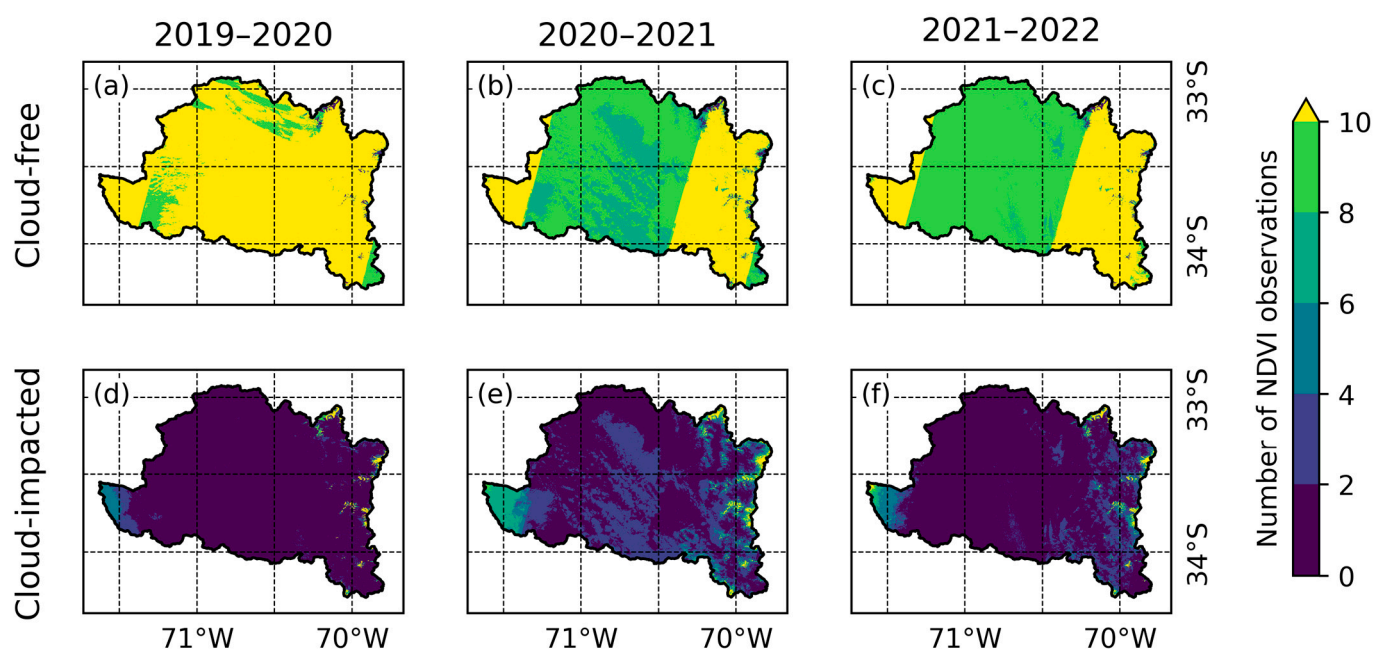
\* Correspondence: benjamingoffin@virginia.edu

## Contents of this file:

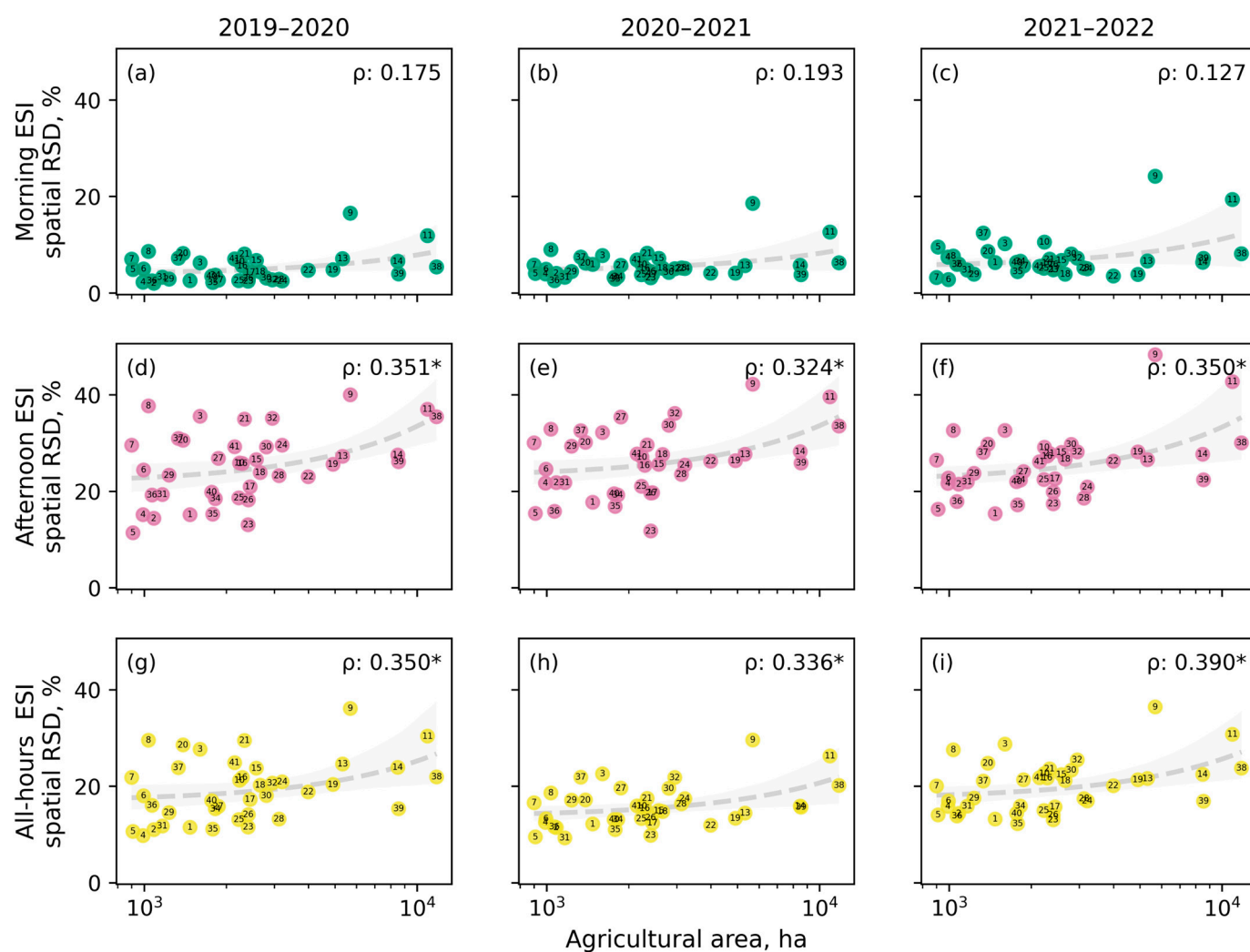
- Figure S1: Number of ESI observations from ECOSTRESS
- Figure S2: Number of NDVI observations from Landsat 8
- Figure S3: Trends in the relative standard deviation of ESI against the size of agricultural areas
- Table S1: Summary of correlation coefficients between ESI and NDVI
- Table S2: Summary of correlation coefficients between ESI and Water-Use Rights



**Figure S1.** Number of ESI observations from ECOSTRESS (with nominal quality or higher) over the Maipo River Basin at different times of day (vertically) during successive growing seasons (horizontally). Brighter colors indicate more observations available. Diagonal patterns illustrate overlapping swaths from ECOSTRESS.



**Figure S2.** Number of NDVI observations from Landsat 8 impacted by cloud cover or not (vertically) during successive growing seasons (horizontally) across the Maipo River Basin. Pixels impacted by cloud cover or cloud shadow were masked and excluded from our analyses.



**Figure S3.** Trends in the spatial Relative Standard Deviation (RSD) of the Evaporative Stress Index (ESI) from ECOSTRESS (y-axis) against the size (x-axis) of agricultural areas with different water allocations in the Maipo River Basin for various times of day (vertically) and growing seasons (horizontally). Note that these areas vary in size along a logarithmic scale. The positive correlation between the two variables is illustrated by a regression line (dashed) and its 95% confidence interval (shaded). Spearman's  $\rho$  coefficients is shown as a measure of the monotonic association between two variables. Significance levels are indicated based on the thresholds of  $p < 0.05$  (\*).

**Table S1.** Summary of correlation coefficients between ESI at various times of the day and NDVI.

ESI	Local Time	Spearman's $\rho$ with NDVI			Kendall's $\tau$ with NDVI		
		2019–2020	2020–2021	2021–2022	2019–2020	2020–2021	2021–2022
Morning	5:00 a.m. – 9:59 a.m.	0.829***	0.544***	0.578***	0.638***	0.379***	0.393***
Afternoon	12:00 p.m. – 4:59 p.m.	0.311	0.267	0.326*	0.206	0.196	0.228*
All-hours	5:00 a.m. – 6:59 p.m.	0.624***	0.249	0.329*	0.457***	0.177	0.228*

**Table S2.** Summary of correlation coefficients between ESI at various times of the day and Water-Use Rights.

ESI	Local Time	Spearman's $\rho$ with Water-Use Rights			Kendall's $\tau$ with Water- Use Rights		
		2019–2020	2020–2021	2021–2022	2019–2020	2020–2021	2021–2022
Morning	5:00 a.m. – 9:59 a.m.	0.550***	0.556***	0.436***	0.416***	0.425***	0.338***
Afternoon	12:00 p.m. – 4:59 p.m.	0.185	0.140	0.243	0.149	0.116	0.187
All-hours	5:00 a.m. – 6:59 p.m.	0.394*	0.137	0.268	0.295**	0.108	0.203