COPERNICUS MASTER IN DIGITAL EARTH

With the support of the Erasmus+ Programme of the European Union

How reliable are SEN2 cloud detection algorithms?

Global uncertainty estimation using Deep Kernel Learning.

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Erasmus Mundus Joint Master Degree Programme
Copernicus Master in Digital Earth
Specialization track GeoData Science

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Acknowledge

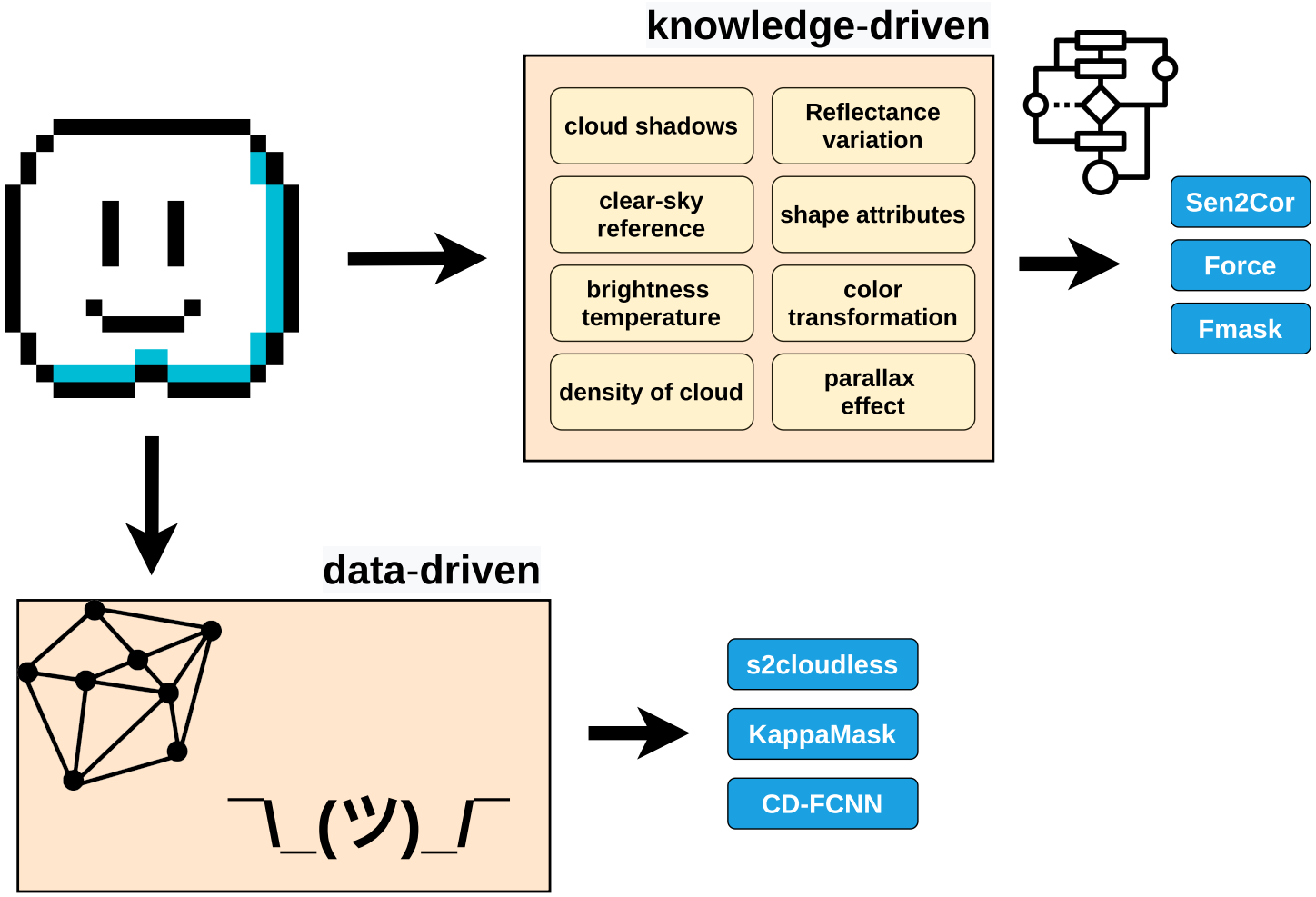
With the support of the Erasmus+ Programme of the European Union

consortium

What is a cloud?

A cloud is a mass of water drops or ice crystals suspended in the atmosphere.

What is a cloud?



Context - I

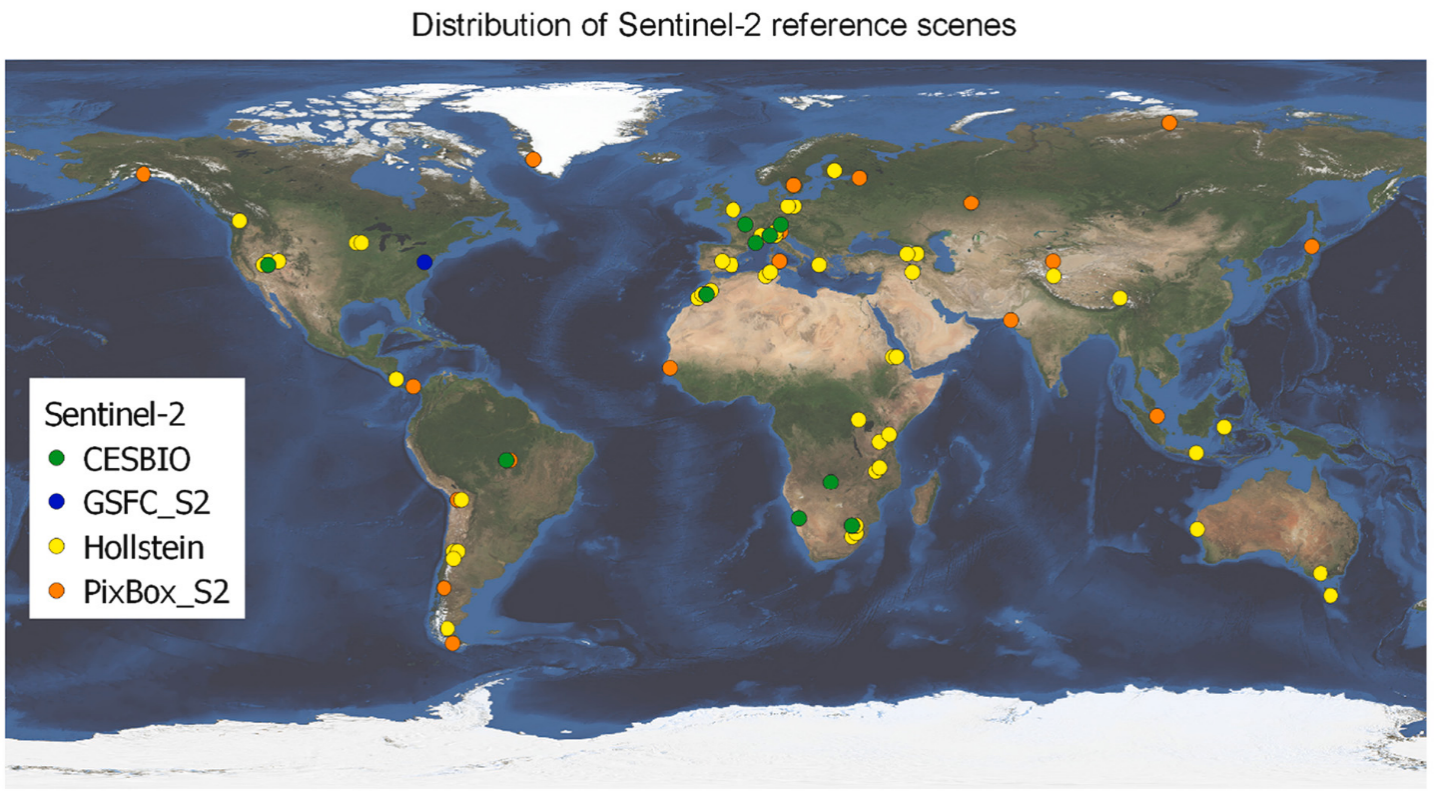
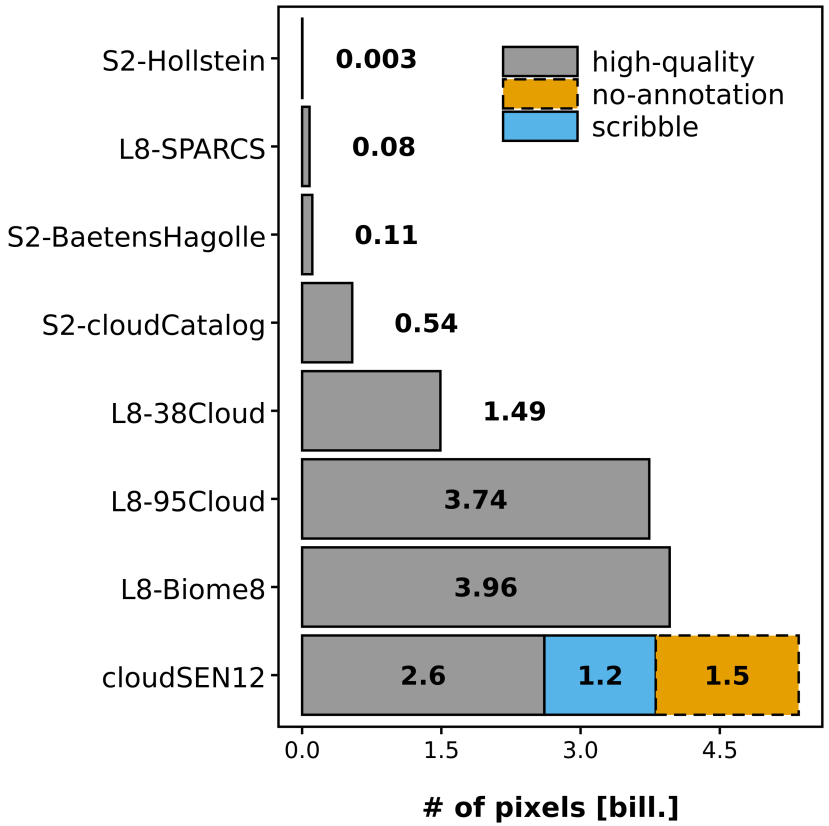


Figure: Geographical distribution reference cloud detection datasets for Sentinel-2 (Skakun et al. 2022).

Context - II



- Cloud labels created by human photo-interpretation, active learning and ground-based camaras.

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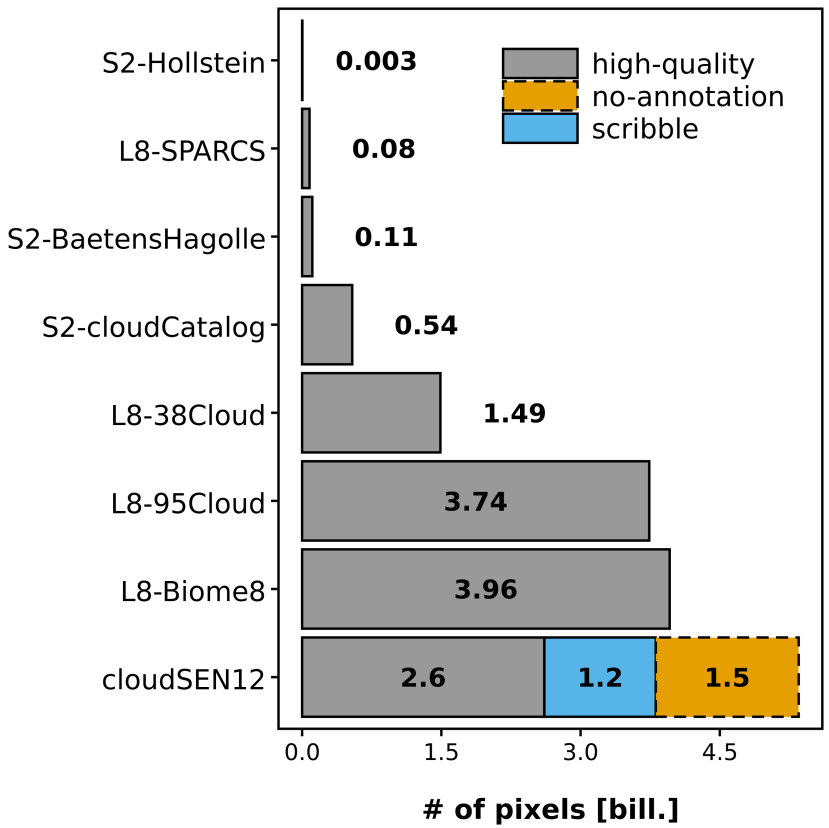

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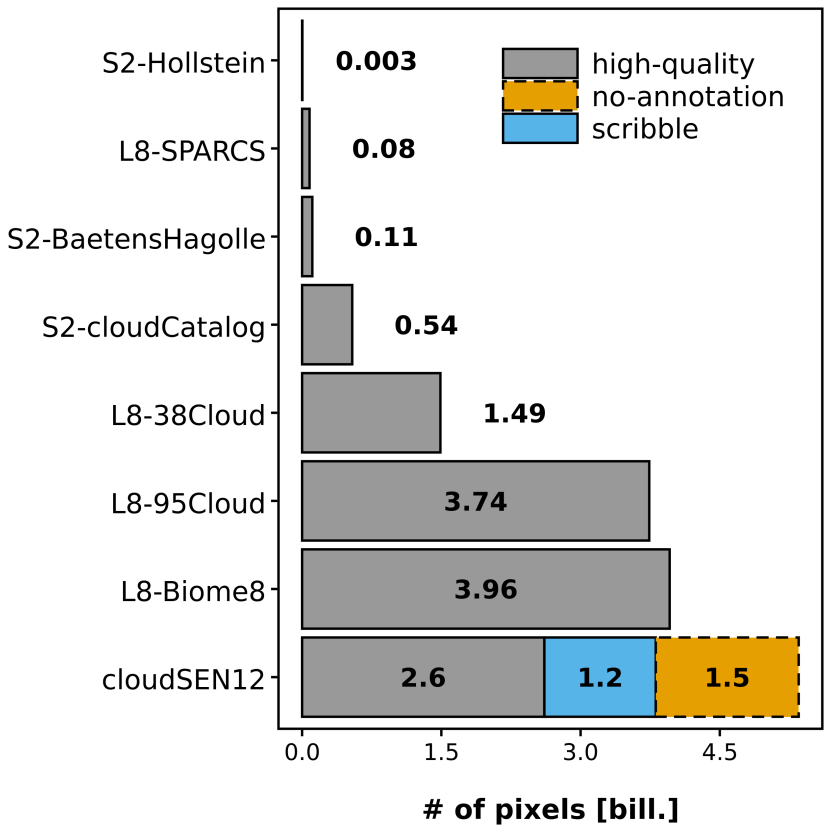
- **No temporal features**.

Context - II



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- **No temporal features**.
- High class imbalance.

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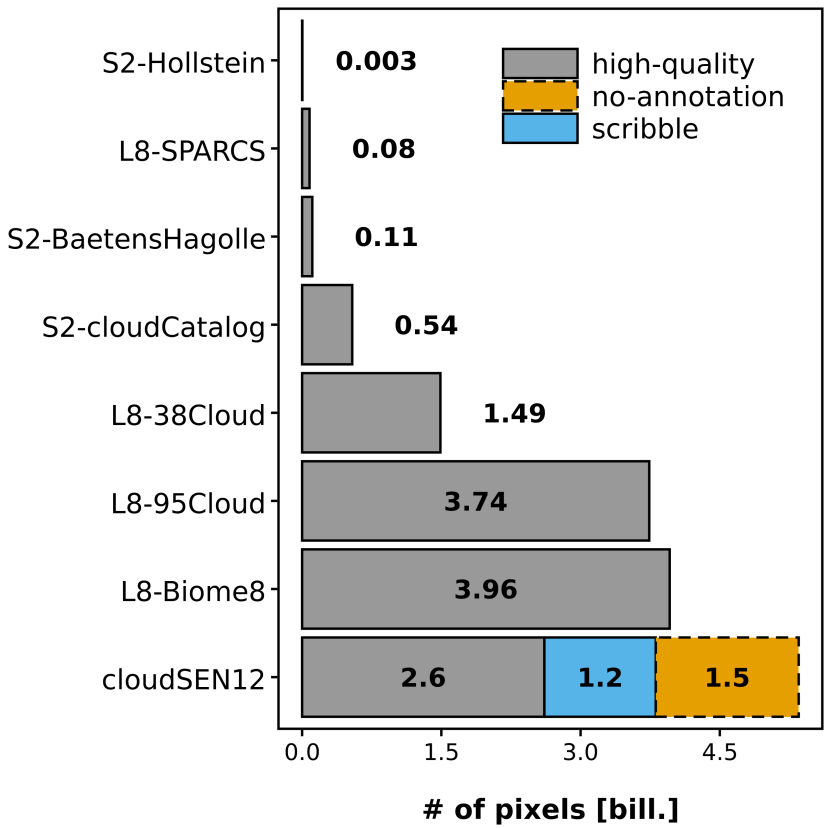

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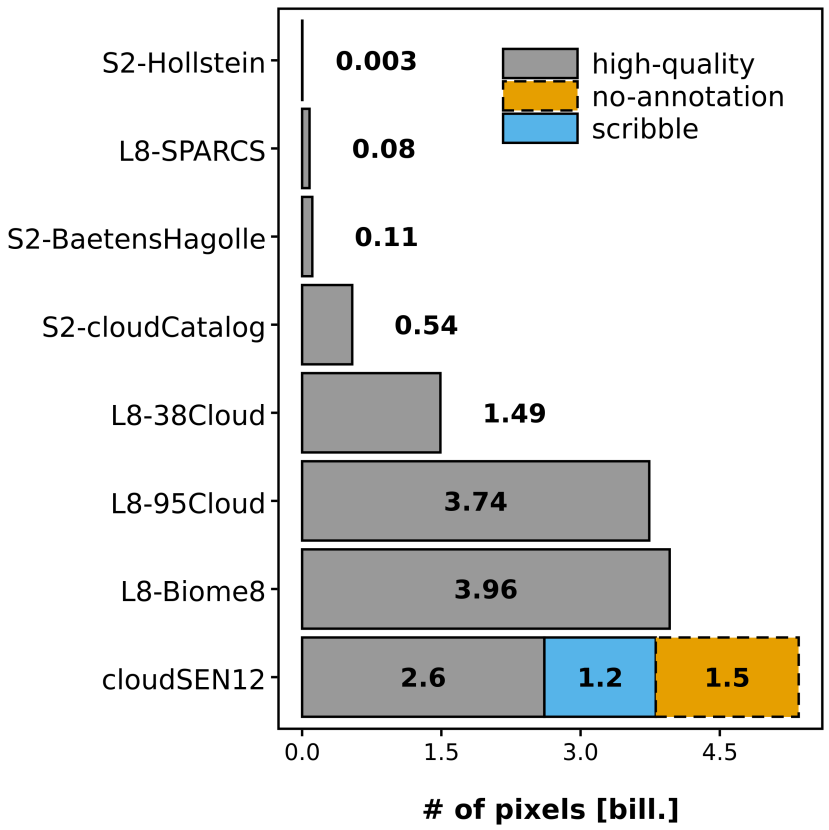
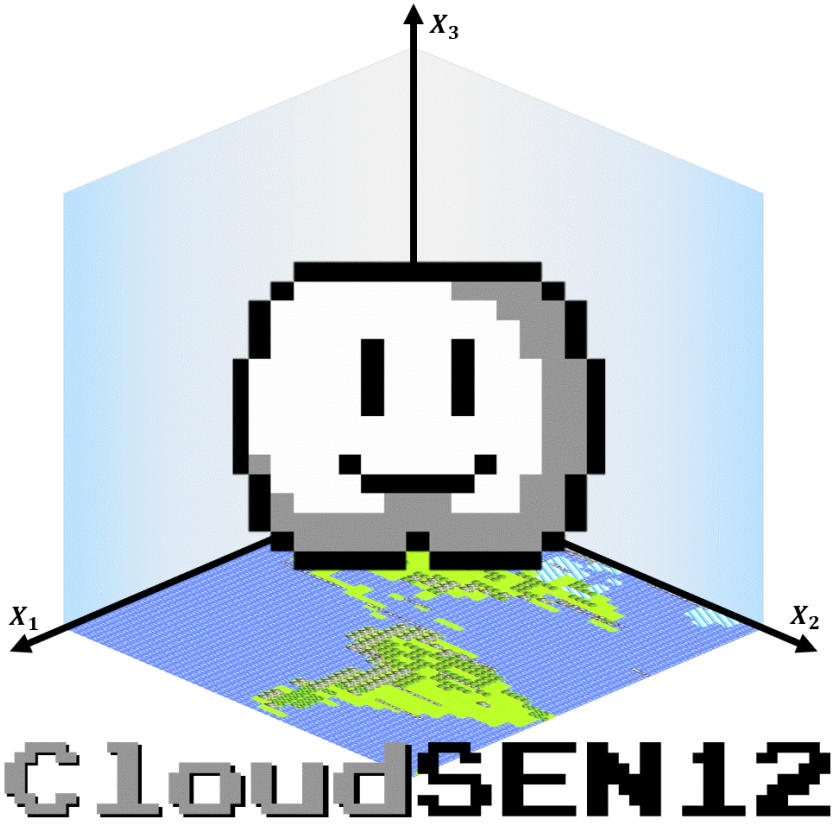


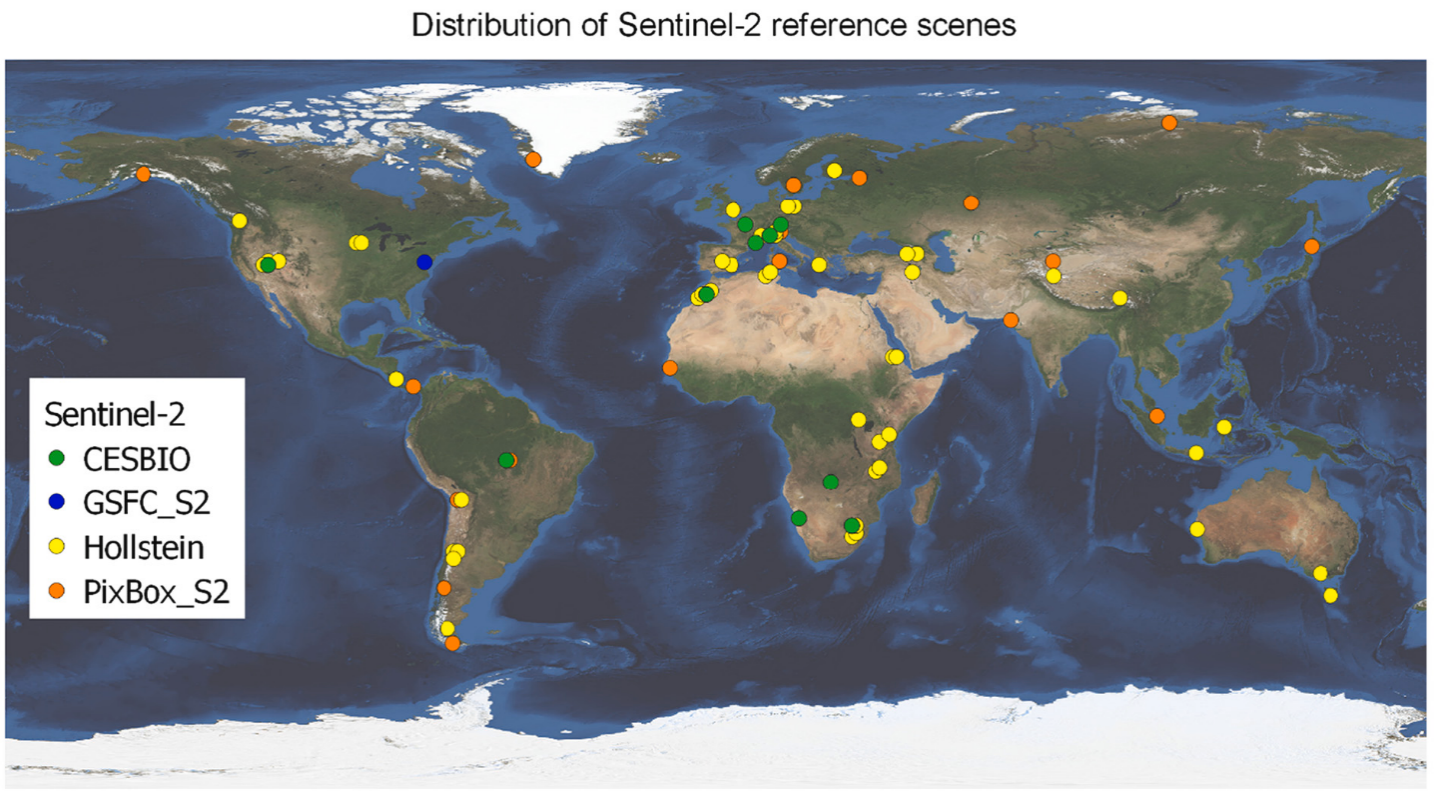
- Cloud labels created by human photo-interpretation, active learning and ground-based camaras.
- **No temporal features**.
- High class imbalance.
- Created by ***closed science practices***.
- **The quality of some datasets is poor.**

CloudSEN12 - I



https://cloudsen12.github.io/

Context - II



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CloudSEN12 - II

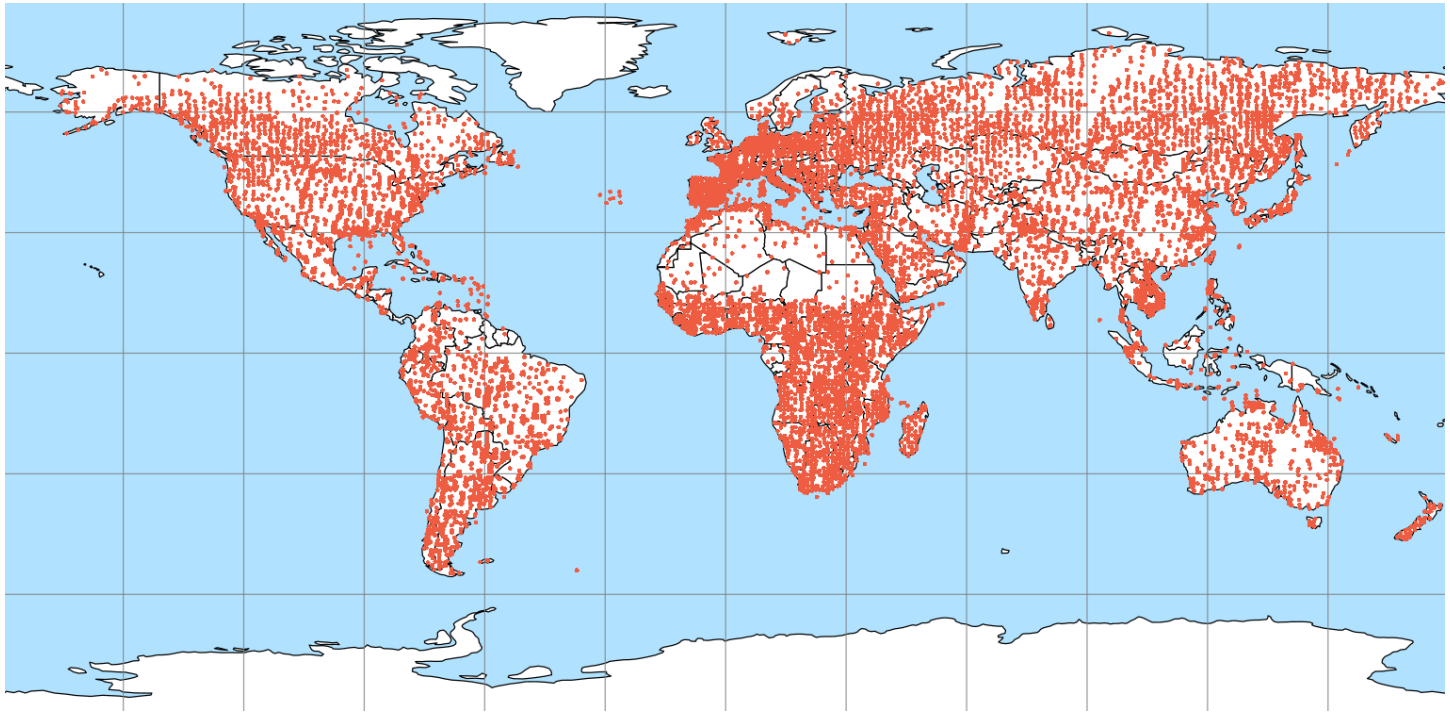

Figure: CloudSEN12 spatial distribution

Overview

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- The trivial Set Cover algorithm has running time of $\mathcal{O}(2^n)$.

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- bla, bla, bla...

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References

- Fomin FV, Grandoni F & Kratsch D, 2009, *A note on the complexity of minimum dominating set* , Journal of Discrete Algorithms, **4(2)**, pp. 209–214.
- Grobler PJP & Mynhardt CM, 2009, *Secure domination critical graphs*, Discrete Mathematics, **309**, pp. 5820–5827.
- Van Rooij JMM & Bodlaender HL, 2011, *Exact algorithms for dominating set*, Discrete Applied Mathematics, **159**, pp. 2147–2164.