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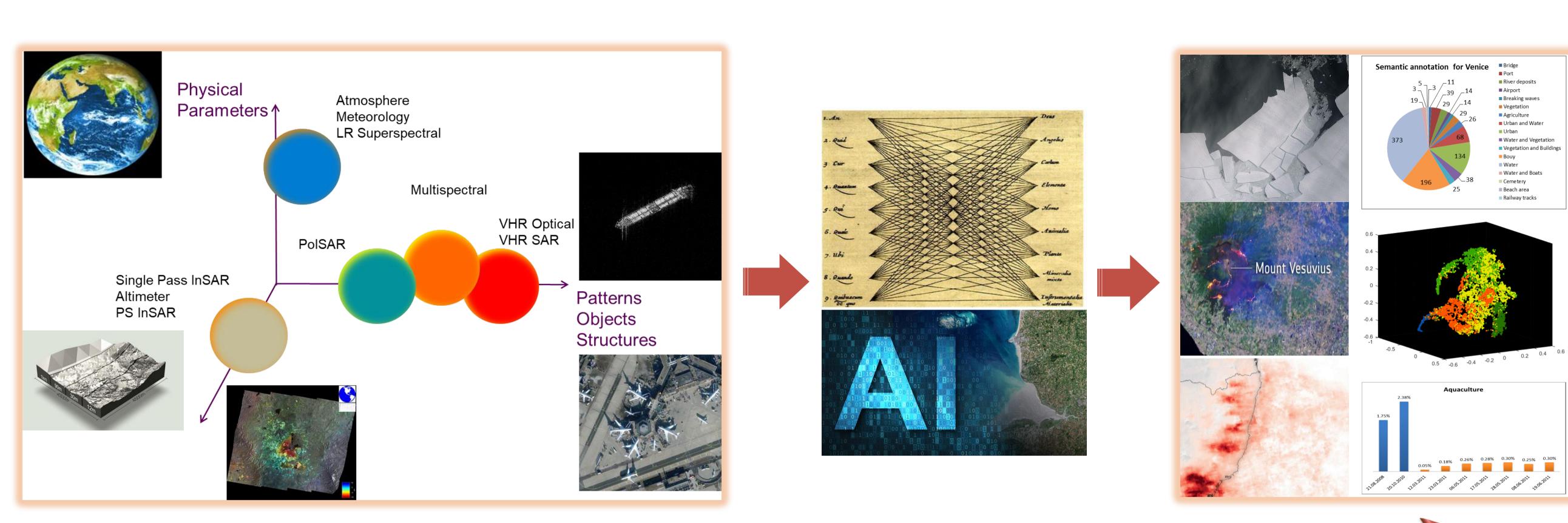
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xAI – Explainable Deep Learning for Earth Observation

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The roadmap towards bringing Earth science data closer to practical applications



Artificial Intelligence (AI) is currently studied mainly for optical imagery, i.e. photography. Earth Observation (EO) images are basically different and much more complex. Al for EO requires specific methods for the full information extraction from spatial, temporal or spectral information at global scale. This involves new paradigms to analyze jointly multimodal sensor records as the EO multi-sensor data optical, IR or microwaves. EO records data of high complexity, physically-based, dynamic, non-linear coupled Earth System. We need to develop new AI paradigms with integrated physical principles into the learning mechanism. These are well beyond and do not emerge form the present cats and dogs recognition techniques. Thus, there is a huge motivation in developing AI for EO methods and exploiting the results.

bistatic iso-ranges ground-based receiver ground focusing grid Z1 – Bragg Surface Z2 – Dipole H - alpha plane (dual -pol) Z3 – Dihedral reflector Common elements MONOSTATIC AND BISTATIC Z4 – Random surface Z5 – Anisotropic particles Z6 – Double reflection propagation effects **Z7** – Random anisotropic scatterers **Z8** – Complex structures **Double** bounce scattering Volume \mathbb{Z}_2 scattering \mathbb{Z}_4 Surface scattering Moderately Quasi-deterministic

Physics informed Al for EO

