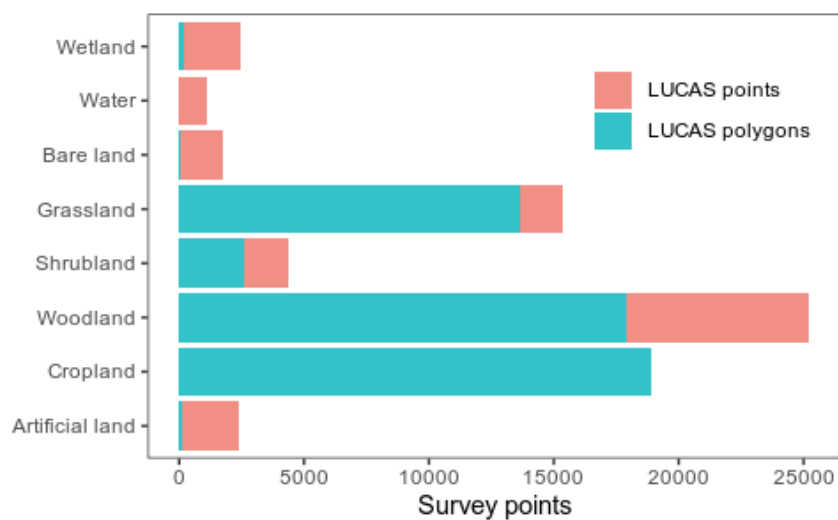


## Supplementary tables and figures

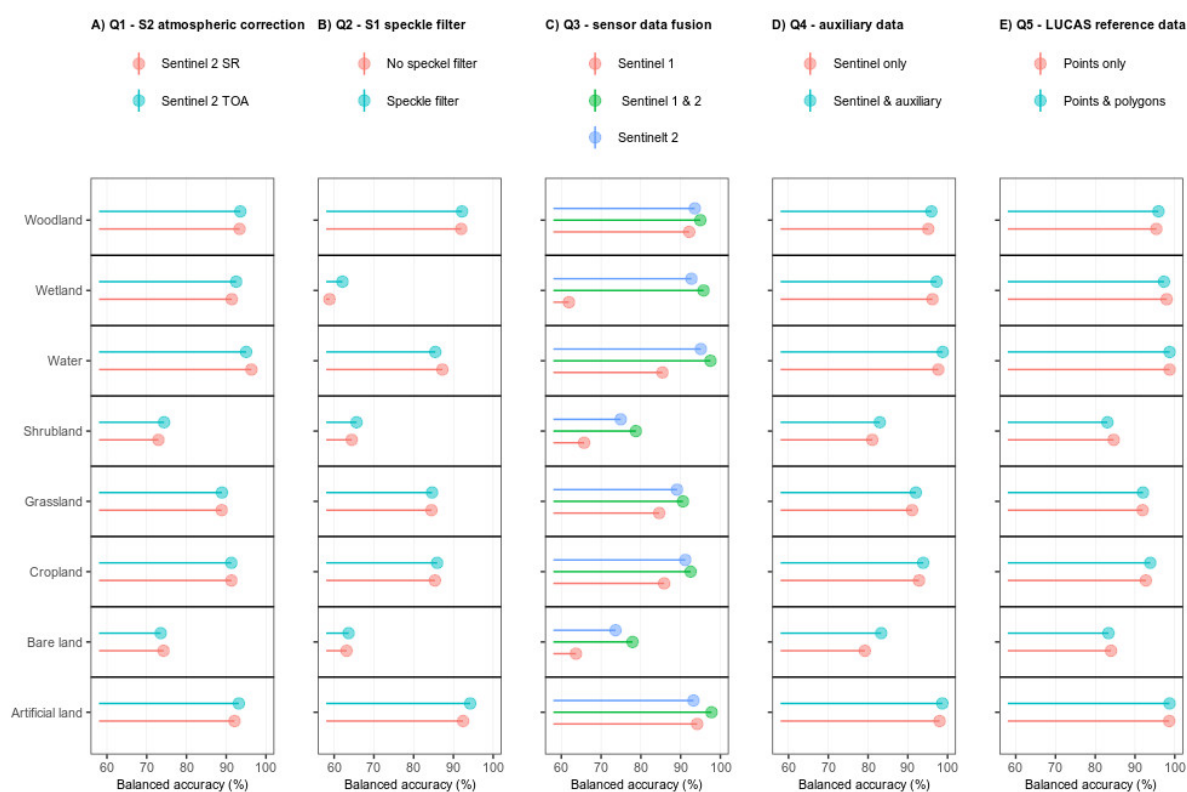
**Table S1.** Land cover maps used for comparison with ELC10 were reclassified into the ELC10 (based on LUCAS high level typology) typology. The lookup tables to show reclassifications are presented below.

<b>FROM-GLC10</b>	<b>ELC10</b>
Cropland	Cropland
Forest	Woodland
Grassland	Grassland
Shrubland	Shrubland
Wetland	Wetland
Water	Water
Tundra	Grassland
Artificial	Artificial land
Bare land	Bare land
Snow/ice	Water
<b>S2GLC</b>	<b>ELC10</b>
	Artificial land
Artificial surfaces	Artificial land
Cultivated areas	Cropland
Vineyards	Cropland
Broadleaf tree cover	Woodland
Coniferous tree cover	Woodland
Herbaceous vegetation	Grassland
Moors and heathlands	Grassland
Sclerophyllous vegetation	Shrubland
Marshes	Wetland
Peatbogs	Wetland
Natural material surfaces	Bare land
Permanent snow covered surfaces	Water
Water bodies	Water
<b>Pflugmacher</b>	<b>ELC10</b>
Artificial land	Artificial land
Cropland seasonal	Cropland
Cropland perennial	Cropland
Forest broadleaf	Woodland
Forest coniferous	Woodland
Forest mixed	Woodland
Shrubland	Shrubland
Grassland	Grassland
Bare land	Bare land
Water	Water
Wetland	Wetland
Snow/ice	Water

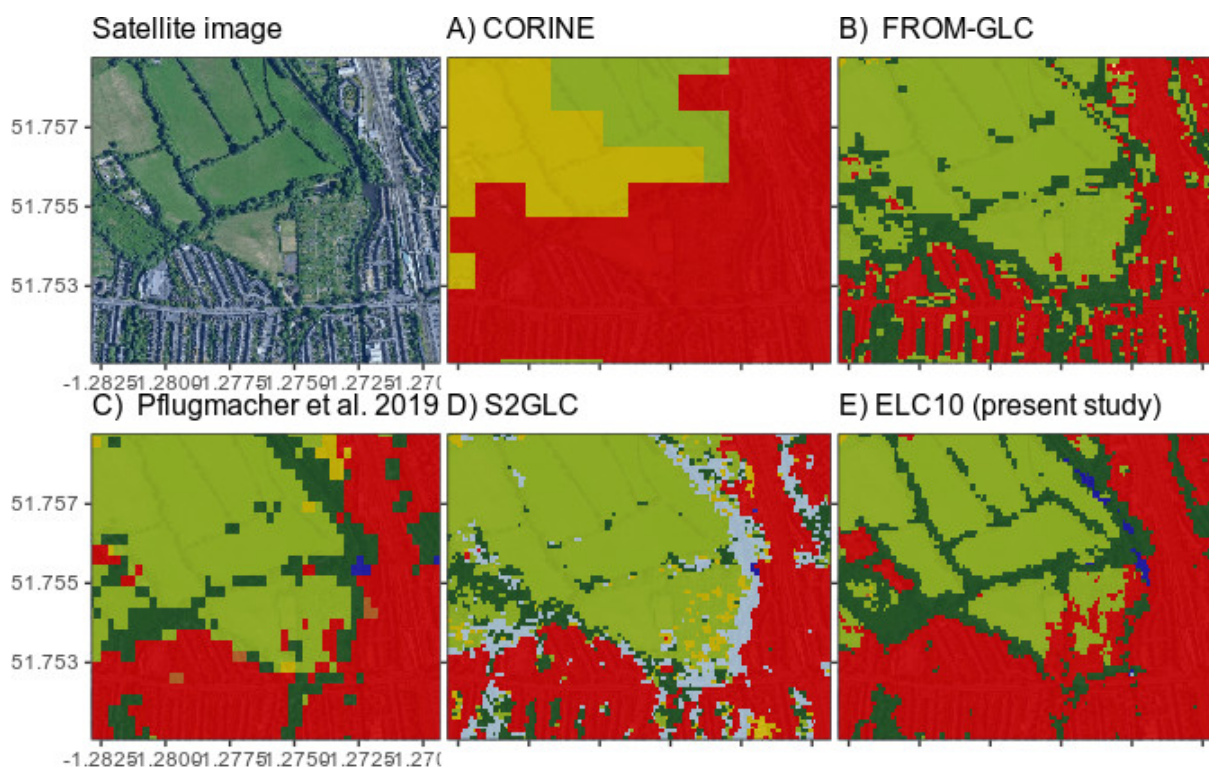
<b>CORINE</b>	<b>ELC10</b>
Urban fabric	Artificial land
Industrial, commercial, and transport units	Artificial land
Mine, dump, and construction sites	Bare land
Artificial, non-agricultural vegetated areas	Artificial land
Arable land	Cropland
Permanent crops	Cropland
Pastures	Grassland
Heterogeneous agricultural areas	Cropland
Forests	Woodland
Scrub and/or herbaceous vegetation associations > Natural grasslands	Grassland
Scrub and/or herbaceous vegetation associations > Moors and heath-land, Sclerophyllous vegetation, Transitional woodland-shrub	Shrubland
Open spaces with little or no vegetation	Bare land
Inland wetlands	Wetland
Maritime wetlands	Wetland
Inland waters	Water
Marine waters	Water



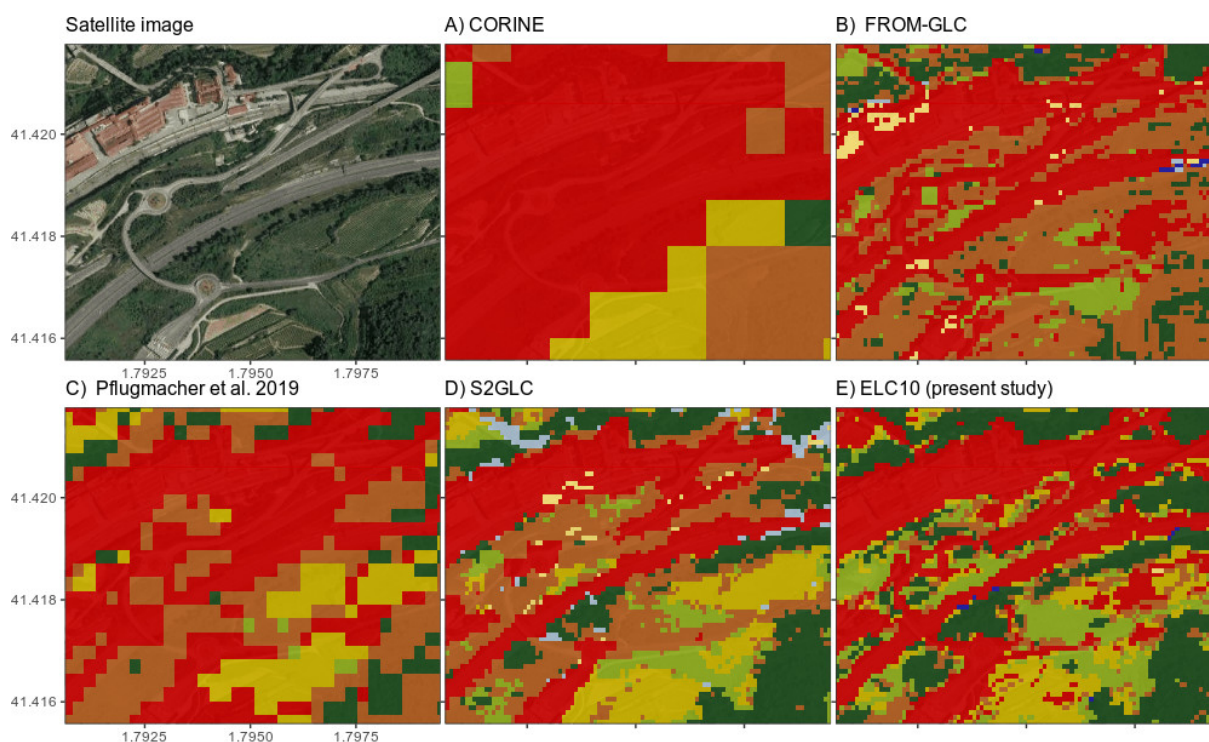
**Figure S1.** Distribution of LUCAS reference points used in the final ELC10 model ( $n = 71\,485$ ) across land cover classes. LUCAS polygons were supplemented with LUCAS points so that the samples sizes were proportional to the CORINE land cover proportions over Europe.



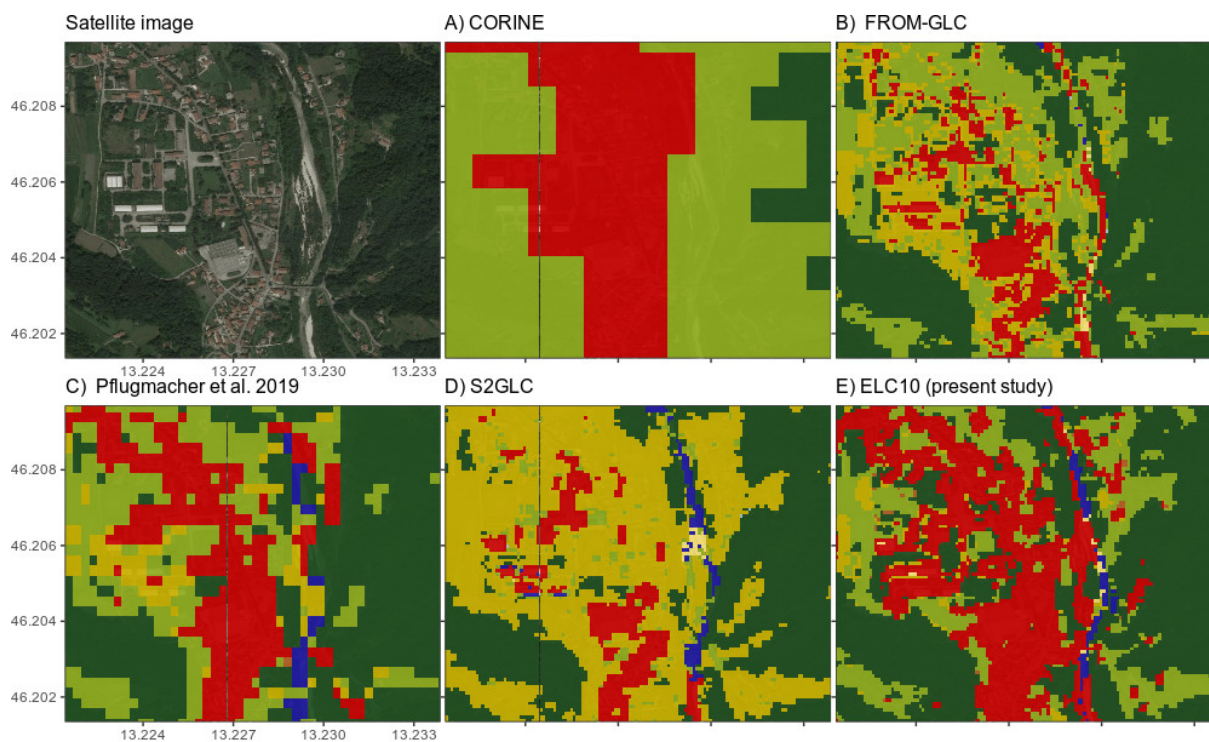
**Figure S2.** The effect of pre-processing decisions on land cover classification accuracy per land cover class. Random Forest model class-specific balanced accuracies are displayed for alternative Sentinel 2 (A), and 1 (B) pre-processing steps, Sentinel 1 and 2 data fusion options (C), the addition of auxiliary variables (D), and the quality of reference data (E).



**Figure S3.** Example of land cover classifications at the local scale for a selected landscape in Ozford, England. Maps are shown for the present study relative to the four comparative datasets.



**Figure S4.** Example of land cover classifications at the local scale for a selected landscape east of Barcelona, Spain. Maps are shown for the present study relative to the four comparative datasets.



**Figure S5.** Example of land cover classifications at the local scale for a selected landscape south of Tarcento, Italy. Maps are shown for the present study relative to the four comparative datasets.