Intermediate snowpack melt-out dates guarantee the highest seasonal grasslands greening in the Pyrenees

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### Supplementary material:

| Year  | Date       | DOY | SnowDepth Obs. | NDVI Obs. |
|-------|------------|-----|----------------|-----------|
| 2020  | February 3 | 34  | X              |           |
|       | February 24| 55  | X              |           |
|       | March 11   | 71  | X              |           |
|       | April 24   | 115 | X              |           |
|       | April 29   | 120 | X              |           |
|       | May 5      | 124 | X              |           |
|       | May 12     | 133 | X              | X         |
|       | May 19     | 140 | X              | X         |
|       | May 26     | 147 | X              | X         |
|       | June 2     | 154 | X              |           |
|       | June 10    | 162 | X              |           |
|       | June 21    | 173 | X              |           |
|       | July 2     | 184 | X              |           |
|       | July 17    | 199 | X              |           |
|       | August 5   | 218 | X              |           |
| 2021  | February 2 | 33  | X              |           |
|       | March 4    | 63  | X              |           |
|       | March 23   | 82  | X              |           |
|       | April 14   | 104 | X              | X         |
|       | May 4      | 124 | X              | X         |
|       | May 20     | 140 | X              | X         |
|       | June 8     | 159 | X              | X         |
|       | July 25    | 169 | X              |           |

**Table S1:** Summary of UAV acquisition during the study period. DOY: Julian Day of the Year.
| 1                                      | 2                                      | 3                                      | 4                                      | 5                                      | 6                                      | 7                                      |
|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Athoxatum odoratum                    | Campanula scheuchzeri                 | Festuca eskia                          | Festuca eskia                          | Alchemilla saxatilis                   | Bellardiochloa variegata               | Androsace laggeri                     |
| Carex nigra                            | Cardamine belldifolia                 | Jasione laevis                         | Jasione laevis                         | Nordus stricta                         | Androsace laggeri                     | Campanula scheuchzeri                 |
| Cerastium fontanum sp.                 | Festuca eskia                         | Leontodon pyrenaicus                   | Pilosella officinarum                   | Androsace vitaliana                    | Crocus autumnalis                      | Conopodium sp.                        |
| Dactylorhiza maculata                  | Leontodon pyrenaicus                   | Jasionella spicata                     | Plantago alpina                         | Anthyllis vulneraria                   | Festuca eskia                         | Festuca nigrescens                    |
| Festuca eskia                          | Leontodon stictu                      | Jasionella alpina                      | Jasionella alpina                      | Jasionella laevis                      | Botrychium lunaria                    | Festuca nigrescens                    |
| Festuca nigrescens                     | Liquen                                 | Pilosella officinarum                   | Campanula scheuchzeri                   | Campanula scheuchzeri                   | Nardus stricta                         | Gaulium cometerhizon                  |
| Jasione laevis                         | Lazula spicata                         | Plantago alpina                         | Leontodon pyrenaicus                    | Euphrasia alpina                       | Ranunculus pyrenaesus                  | Leontodon pyrenaicus                  |
| Nardus stricta                         | Musgo                                 | Sedum anglicum                         | Ranunculus pyrenaucus                   | Festuca eskia                          | Trifolium alpinum                      | Leontodon pyrenaicus                  |
| Phleum alpinum                         | Nardus stricta                         | sedum brevifolium                      | Silene rapestris                        | Festuca nigrescens                      | Trifolium thalii                       | Nardus stricta                        |
| Pilosella officinarum                  | Pilosella officinarum                  | Antennaria dioica                      | Gentiana verna                          | Phleum alpinum                         |                                           |                                        |
| Plantago alpina                        | Plantago alpina                        | Sedum anglicum                         | Homogyne alpina                         | Pilosella officinarum                   |                                           |                                        |
| Ranunculus pyrenaesus                  | Ranunculus pyrenaesus                  | musgo                                 | Jasionella laevis                        | Plantago alpina                         |                                           |                                        |
| Thymus praecox                         | Sedum anglicum                         | Euphrasia alpina                       | Leontodon pyrenaicus                    | sedum brevifolium                      |                                           |                                        |
| Trifolium alpinum                      | Silene rapestris                       | Vaccinium myrtillus                    | Leontodon pyrenaicus                    | Thymus praecox                         |                                           |                                        |
| Trifolium pratense                     | Thymus praecox                         | Phleum alpinum                         | Lotus alpinum                           |                                           |                                           |                                        |
| Veronica serpyllifolia                 | Trifolium alpinum                      | Nardus stricta                         | Vaccinium myrtillus                     |                                           |                                           |                                        |
| Vaccinium myrtillus                    | Pilosella hypeurya                     |                                       |                                        |                                           |                                           |                                        |
| Veronica fruticans                     | Pilosella officinarum                  |                                       |                                        |                                           |                                           |                                        |
| Plantago alpina                        | Plantago alpina                        |                                       |                                        |                                           |                                           |                                        |
| Potentilla brauniana                   |                                       |                                       |                                        |                                           |                                           |                                        |
| Potentilla frigida                     |                                       |                                       |                                        |                                           |                                           |                                        |
| Sagina saginoides                     |                                       |                                       |                                        |                                           |                                           |                                        |
| sedum brevifolium                      |                                       |                                       |                                        |                                           |                                           |                                        |
| Sibbaldia procumbens                   |                                       |                                       |                                        |                                           |                                           |                                        |
| Taraxacum pyrenaicus                   |                                       |                                       |                                        |                                           |                                           |                                        |
| Thymus praecox                         |                                       |                                       |                                        |                                           |                                           |                                        |
| Trifolium alpinum                      |                                       |                                       |                                        |                                           |                                           |                                        |
| Trifolium pratense                     |                                       |                                       |                                        |                                           |                                           |                                        |
| Trifolium thalii                       |                                       |                                       |                                        |                                           |                                           |                                        |
| Vaccinium uliginosum                   |                                       |                                       |                                        |                                           |                                           |                                        |
| Veronica nummularia                    |                                       |                                       |                                        |                                           |                                           |                                        |

**Table S2**: Plant species observed on each survey plot.
Figure S1: Upper panel shows mean, minimum and maximum daily temperatures (5-day moving average). The lower panel depicts the temporal evolution of the snow depth and the total precipitation observed at the automatic weather station.
**Figure S2:** Box plots depicting the temporal evolution of the NDVI for the UAV acquisition dates in the plants survey plots in 2019-2020 (upper panel) and 2020-2021 (bottom panel). The boxes show first and third quantiles and the horizontal line inside each box the second percentile (median). Whiskers of each plot include maximum and minimum values for each plot and day.
**Figure S3:** Box plot (upper panel) of ASD spectrometer and Sequoia camera mounted on the UAV for the four bands and the NDVI computed from the near infrared and red bands. Linear adjustment (bottom panel) between the NDVI observations of the UAV and the ASD.