Microsite amelioration by post-fire deadwood in a *Pinus nigra* planted forest in central Italy

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Interreg
Alpine Space
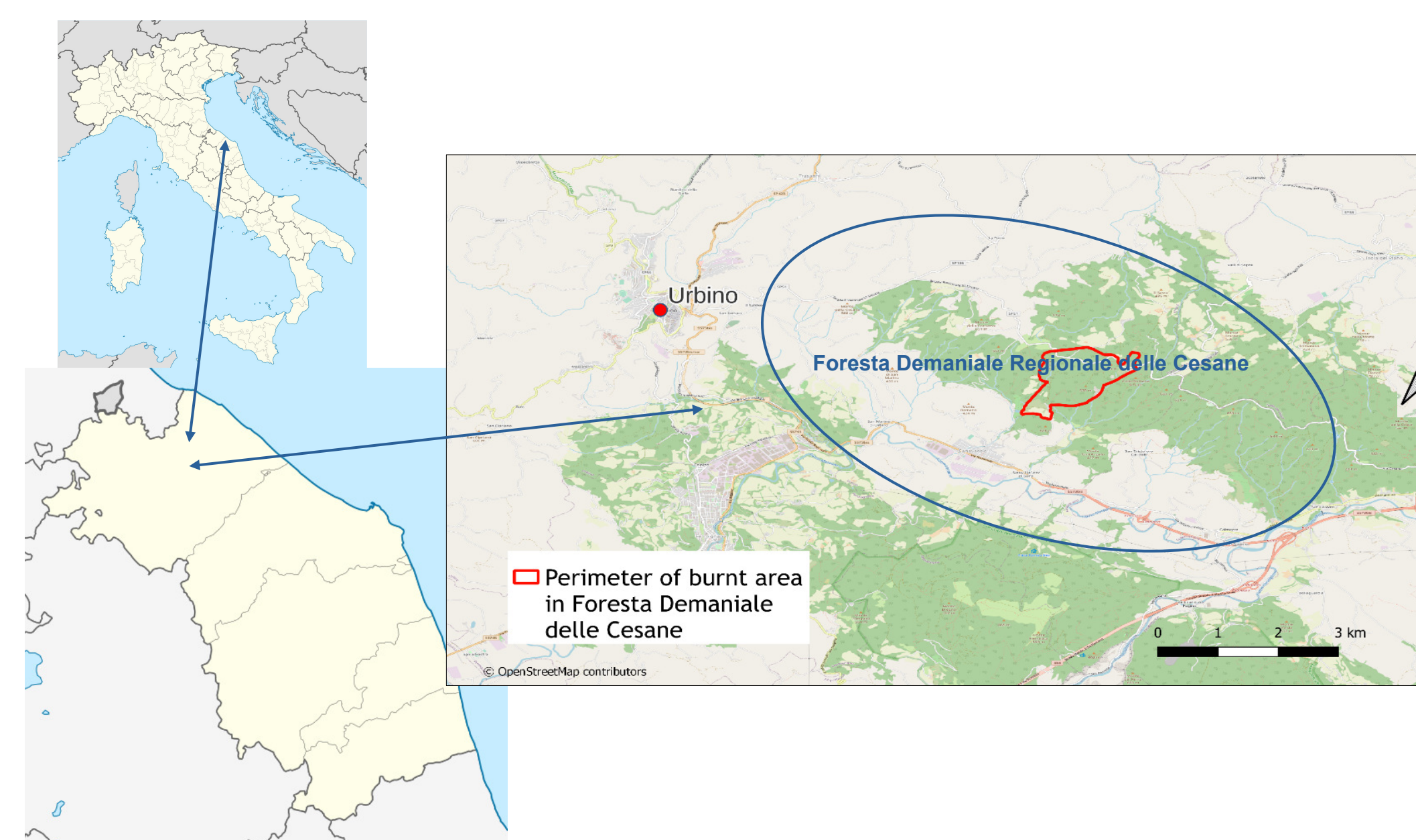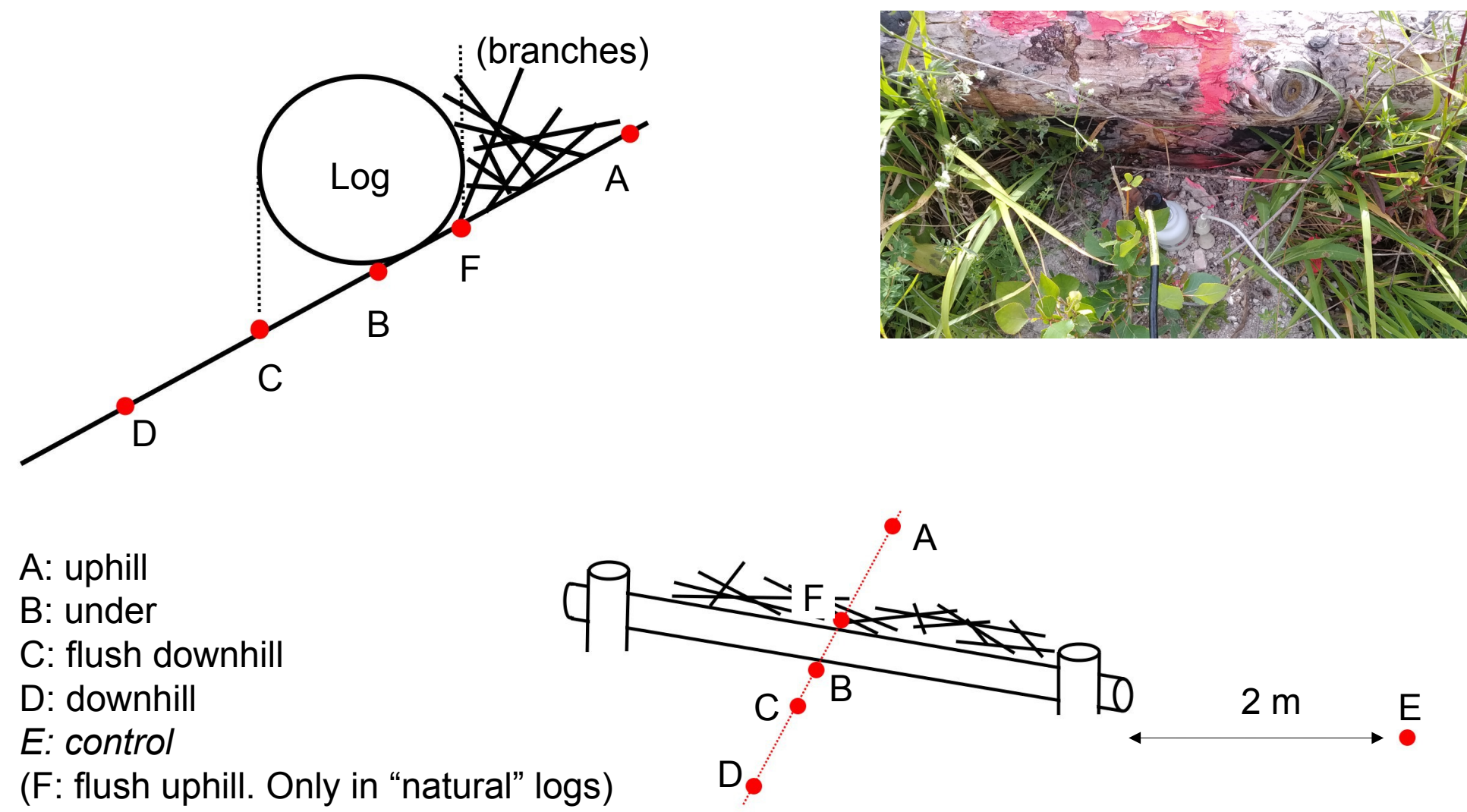Co-funded by the European Union

MOSAIC

AIM

Evaluate if laying deadwood ameliorates microsite conditions for natural regeneration in high-severity burnt pine forests.

OBJECTIVES

- Examine the effect of distance from laying deadwood on near-surface soil temperature and moisture.
- Compare the effect of naturally fallen, and artificially placed logs.

A: uphill
B: under
C: flush downhill
D: downhill
E: control
(F: flush uphill. Only in "natural" logs)

DATA COLLECTION

- Near surface (topmost ~5 cm) soil moisture and temperature (Delta-T HH2 moisture meter + SM150T probe; Testo 108 thermocouple).
- 5+1 (control) positions around "natural" logs, 4+1 around artificial barriers (-1 position: branches uphill).
- 14 "natural" logs, 19 artificial barriers.
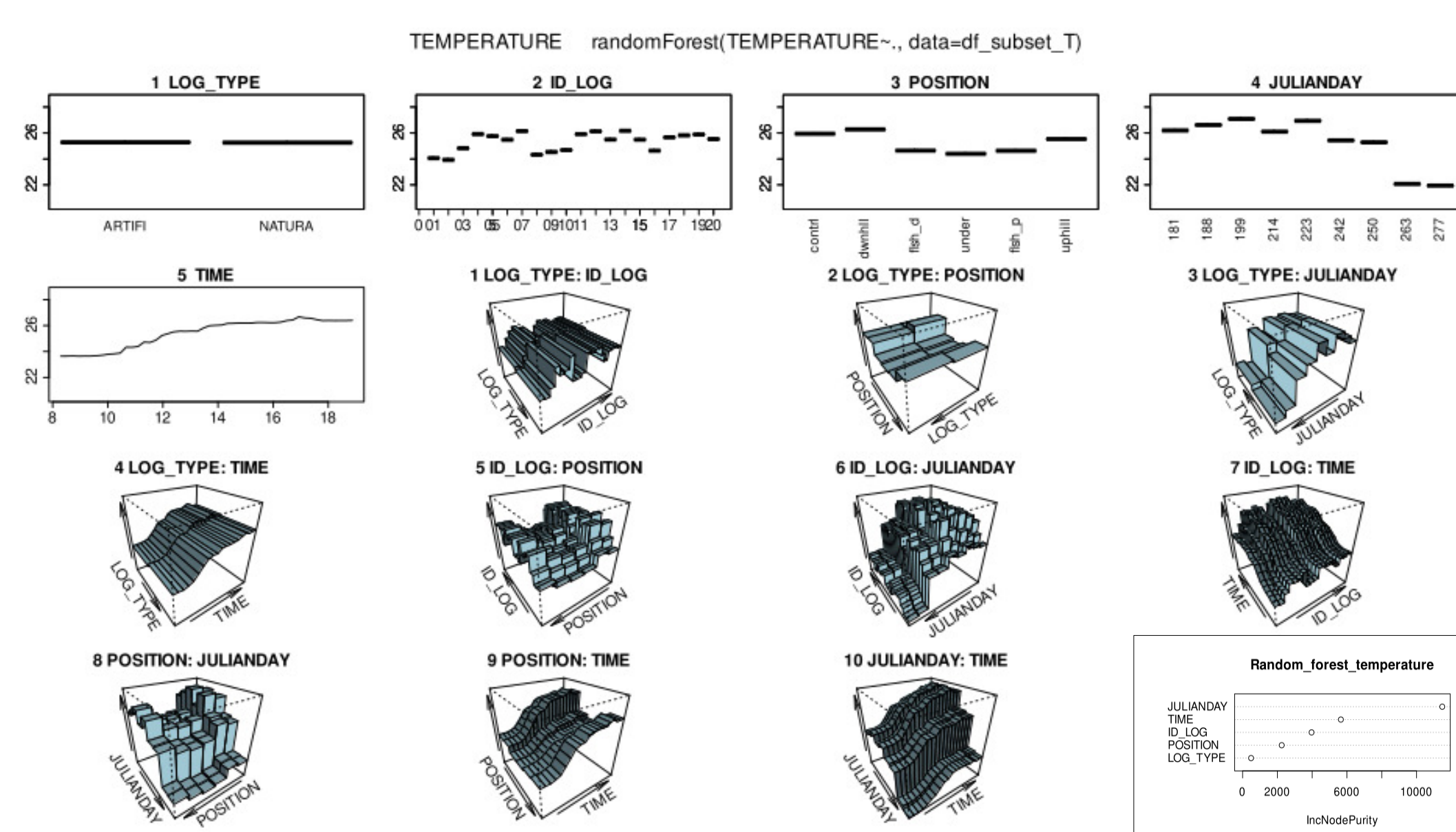- 9 timesteps (28 June → 4 October 2022, ca. every 10 days).
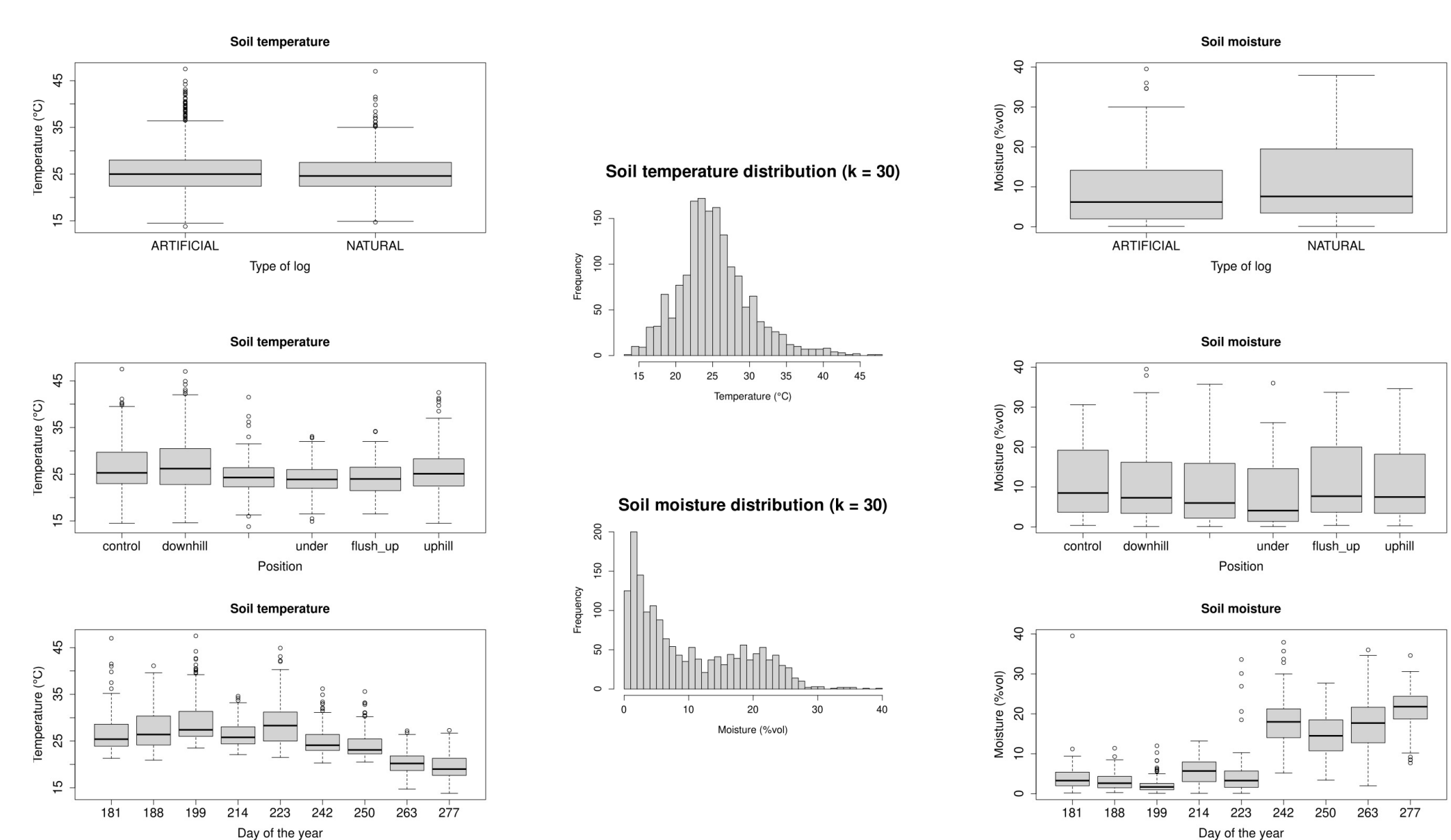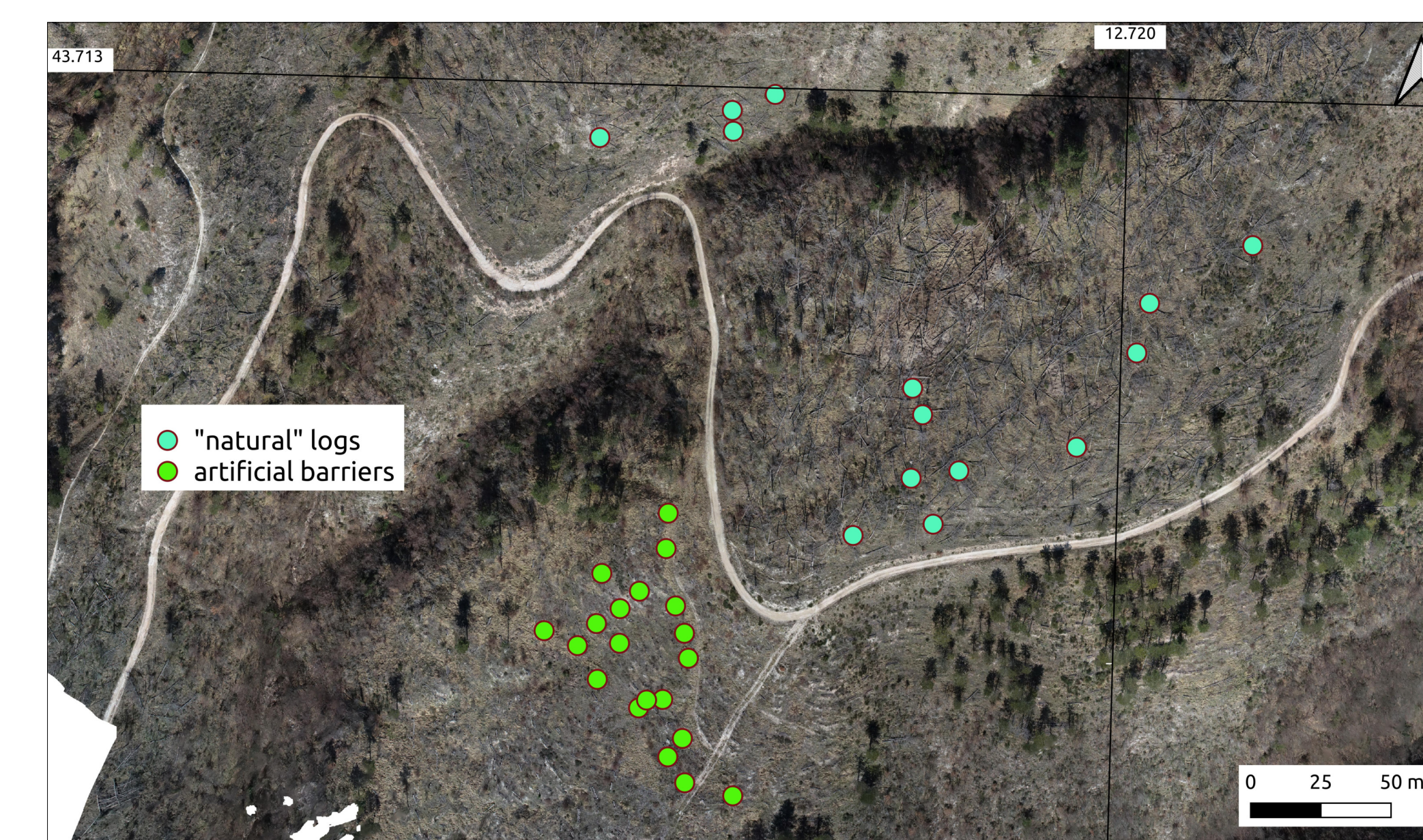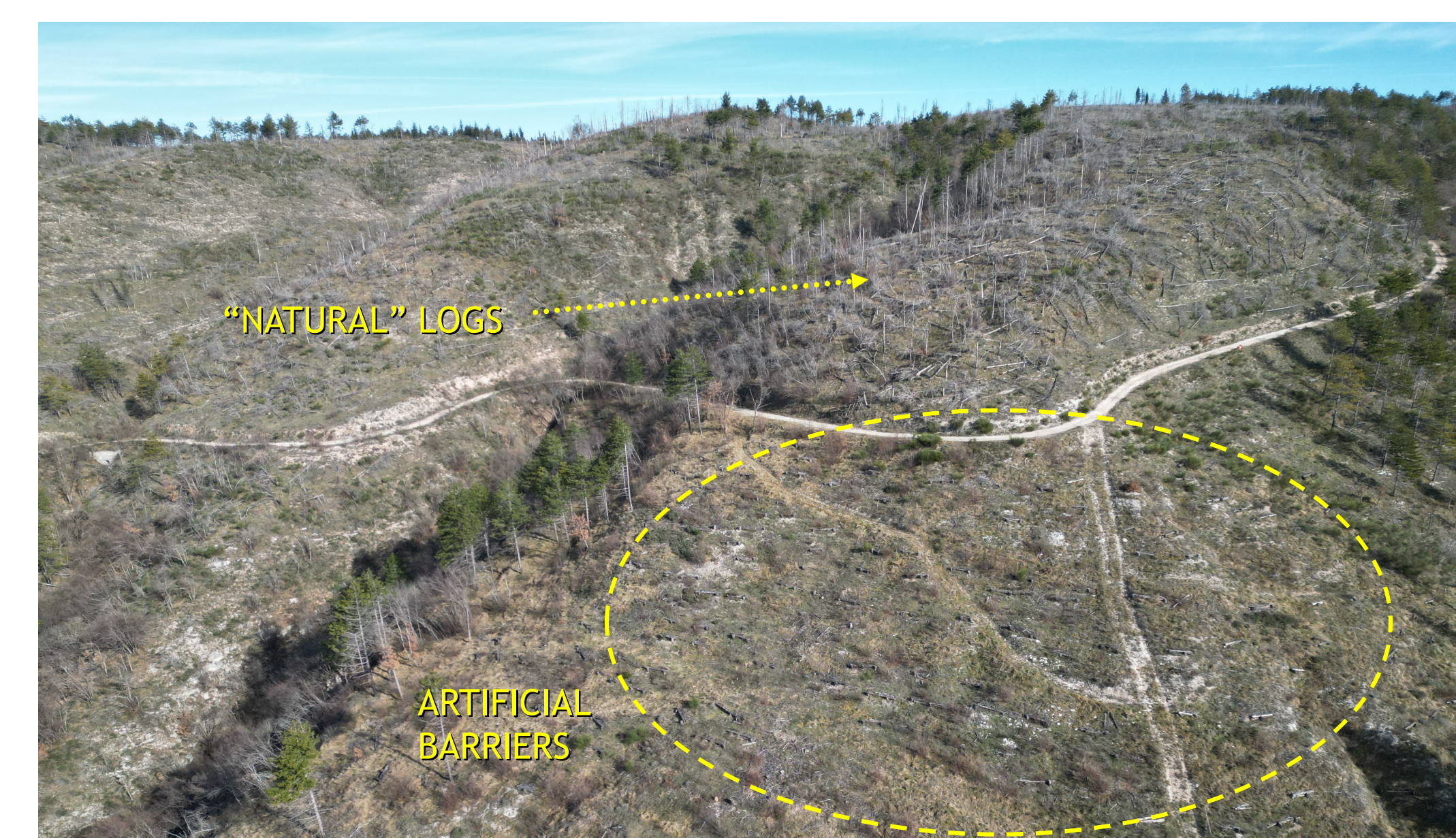
INTRODUCTION

Most intense forest fires in Italy, and in Southern Europe, take place in pine forests.

This study examines the effects of a forest fire occurred near Urbino (Marche, Italy) in July 2017 classified with high severity for ~50 ha.

Burnt stands were 50 y. old plantations dominated by *Pinus nigra* J.F. Arnold, mixed with a minor share of broadleaf species (*Fraxinus ornus* L., *Ostrya carpinifolia* Scop., *Quercus pubescens* Willd.), coherent with the natural composition of nearby forests.
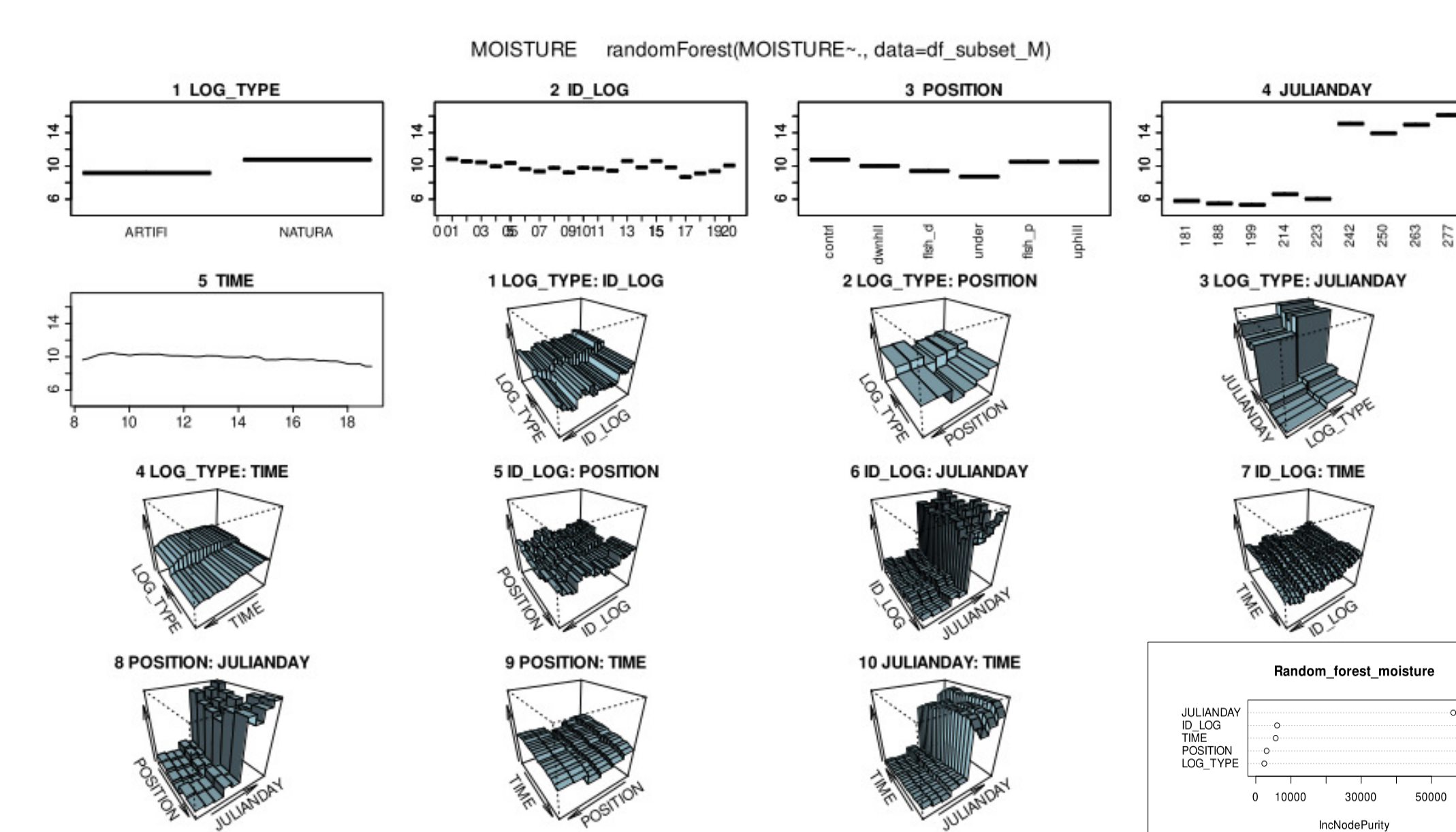

DATA ANALYSIS

- Analyses design:
- Y_i → soil temperature; soil moisture (separately)
- X_i → position around log; artificial/natural log
- Confunding factors → time of day; ID log

Descriptive statistics → non-normal distribution!

Explorative analysis: random forest

PRELIMINARY RESULTS

Mainly date and time affect soil temperature and moisture variability, but also the position with respect to logs has a clear relevance.

FIRST CONCLUSIONS

Soil seems to be cooler and moister right by the logs → if confirmed, these results may suggest preferential microsites for natural or artificial post-fire regeneration in *Pinus nigra* forests.

FUTURE CHALLENGES

- Evaluate the logs facilitation effect on artificial regeneration by planting and sowing trees (*started*).
- Evaluate the effect of ecological facilitators, including shrubs and microtopography, directly on natural regeneration (*ongoing*).
- Repeat the analyses on other study areas (*Alpine Space*).
- Examine if other drivers may be present (unexpected regeneration).
- Apply advanced statistical methods (multivariate regression)