

**Evaluation of functional behavior of wood in
outdoor above ground applications
Project BIA2013-42434R**

Dr. Juan Fernández-Golfín Seco *et al.*

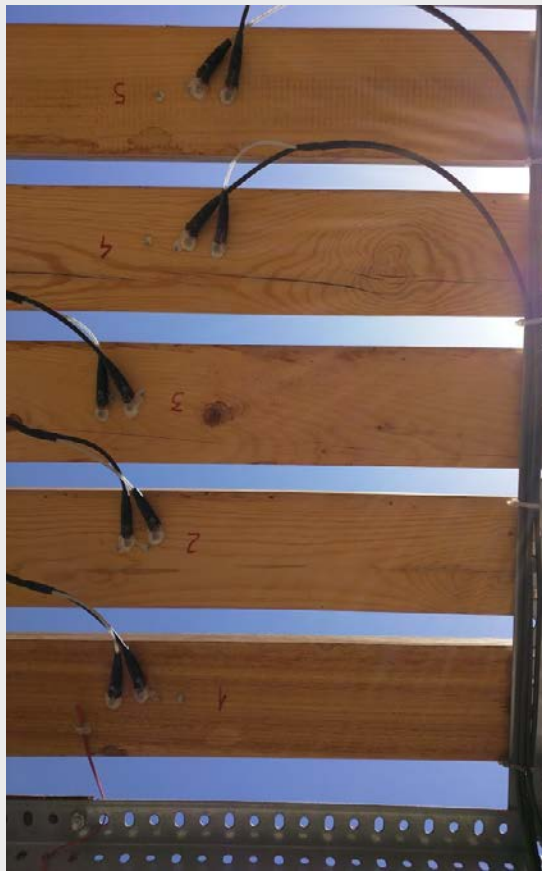
Forest Research Centre (CIFOR)



Evaluation of functional behavior of wood in outdoor above ground applications (PROY. BIA 2013-42434R)

M.C. monitoring under different climatic regimes (Iberian peninsula): effect of species and climatic events (rain, dew, hoarfrost)

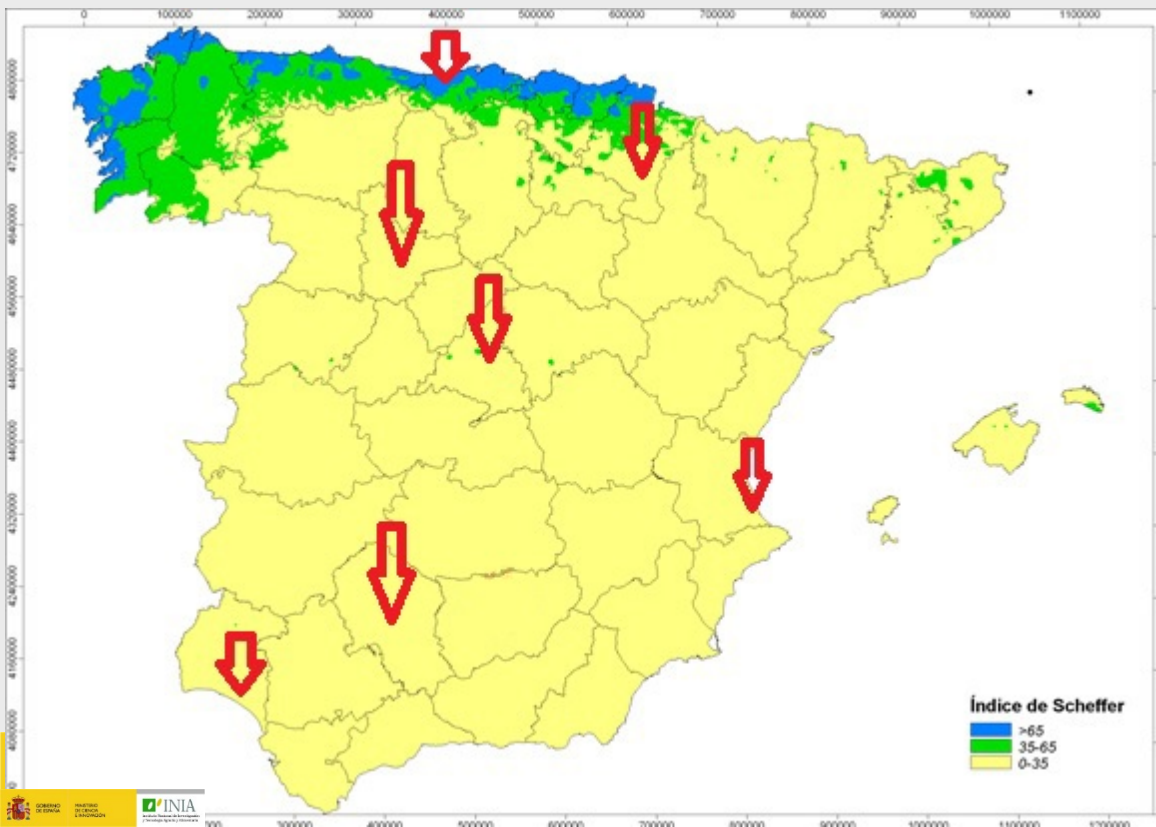
- Seven sites (Llanes, Vitoria, Palencia, Valencia, Madrid, Córdoba, Huelva)
- Seven species: Eucalypt (**EU**), Laricio P. (**PL**), Spruce (**PC**), Scots P. (**PS**), Radiata P. (**PR**), Chestnut (**CS**), Thermotreated Radiata P. (**PRMMT**) and in Madrid also Scots pine gross section (**PSMEG**)



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M.C. monitoring under different climatic regimes (Iberian peninsula): effect of species and climatic events (rain, dew, hoarfrost)

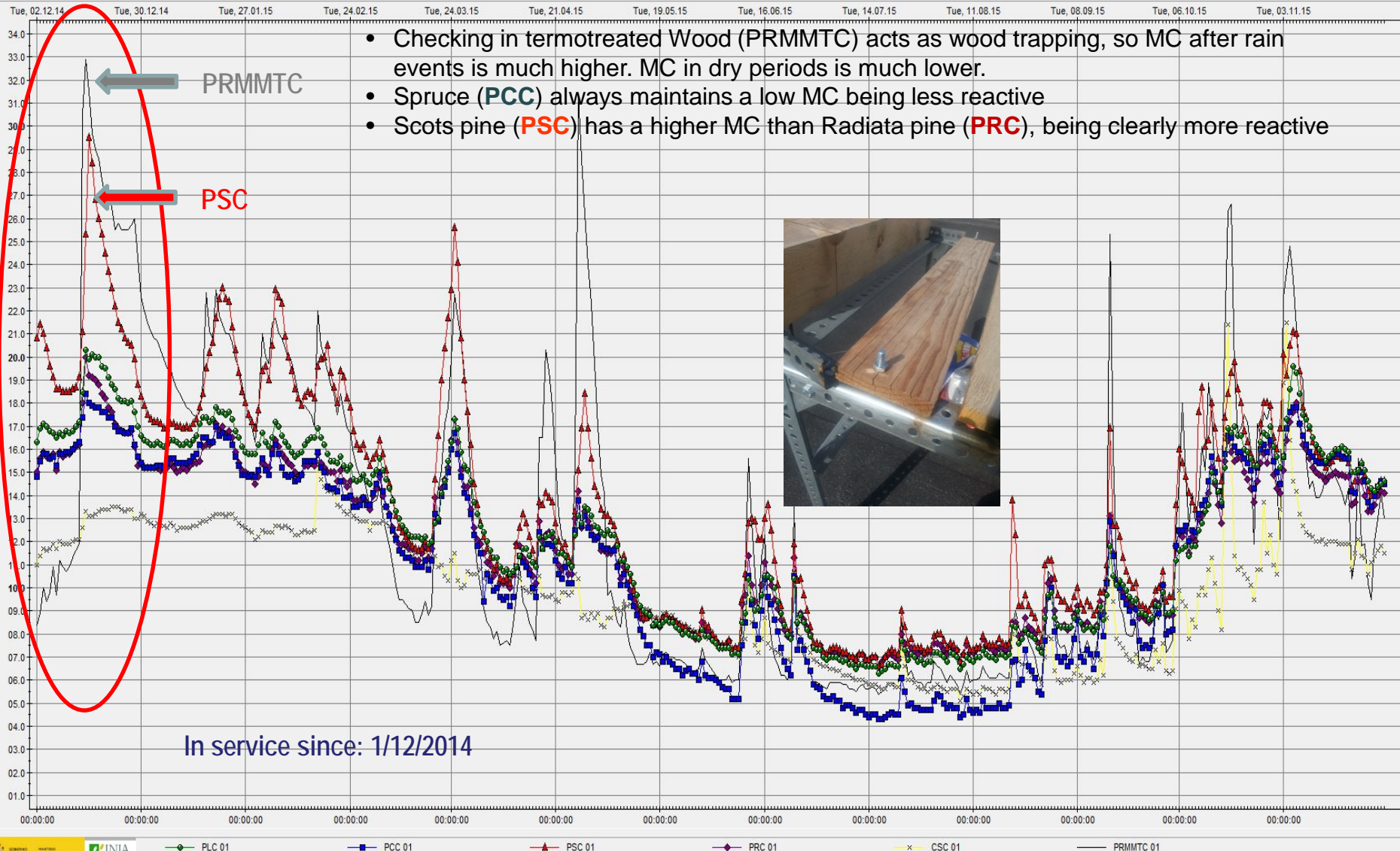
- Three sites with sea effect (Llanes, Valencia, Huelva)
- Four interior sites with continental weather (Madrid, Palencia, Cordoba, Vitoria)
 - Very cold in winter (Palencia) occasionally dew, summer very hot and dry
 - Very cold in winter with strong dew effect (Vitoria), summer hot and dry
 - Very hot in summer with mild dew effect in winter (Cordoba)
 - Cold in winter and hot and dry in summer (Madrid)



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Effect of species: The case of Madrid (Interior, Continental climate)

- Checking in termotreated Wood (PRMMTC) acts as wood trapping, so MC after rain events is much higher. MC in dry periods is much lower.
- Spruce (**PCC**) always maintains a low MC being less reactive
- Scots pine (**PSC**) has a higher MC than Radiata pine (**PRC**), being clearly more reactive

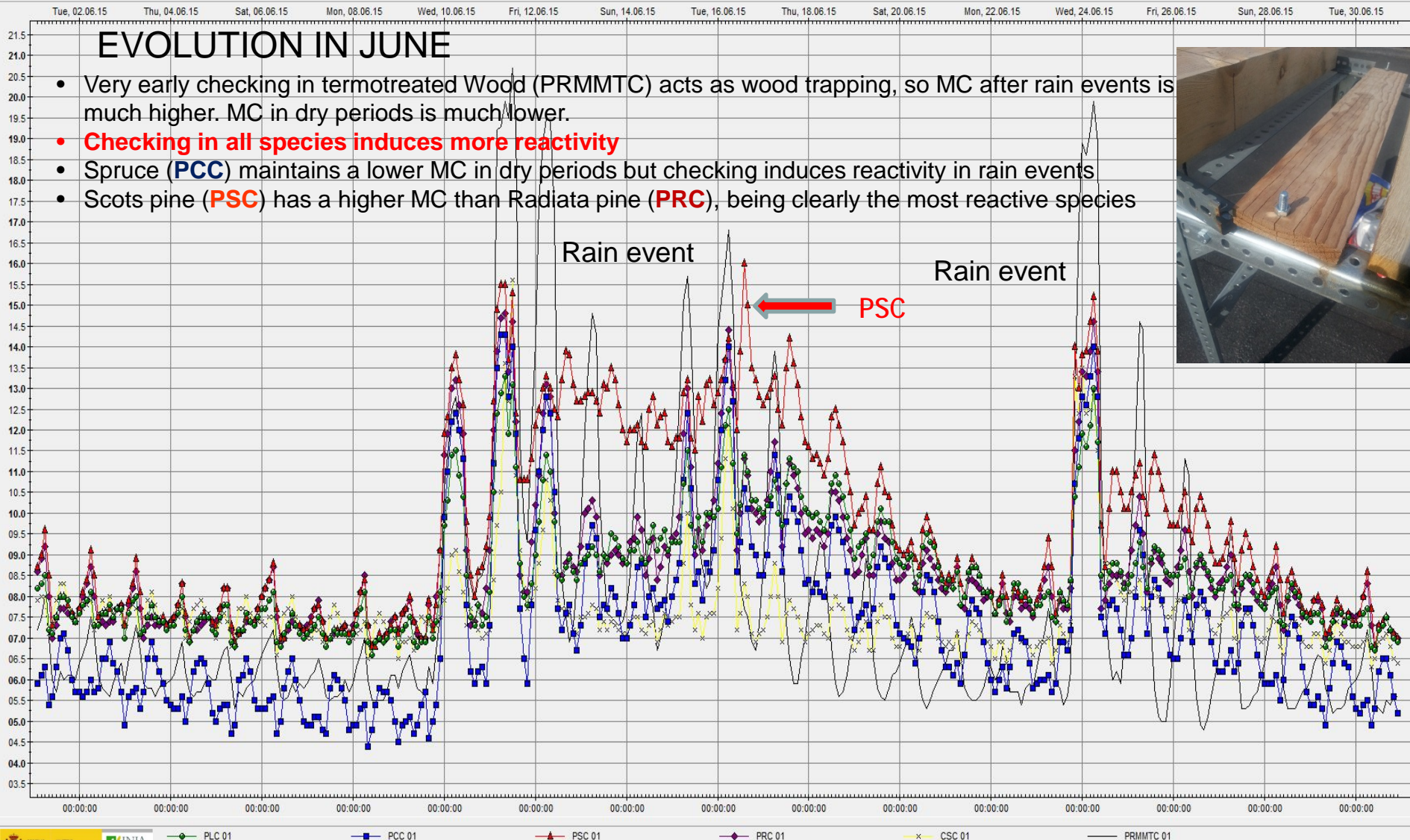


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Effect of species: The case of Madrid (Interior, Continental climate)

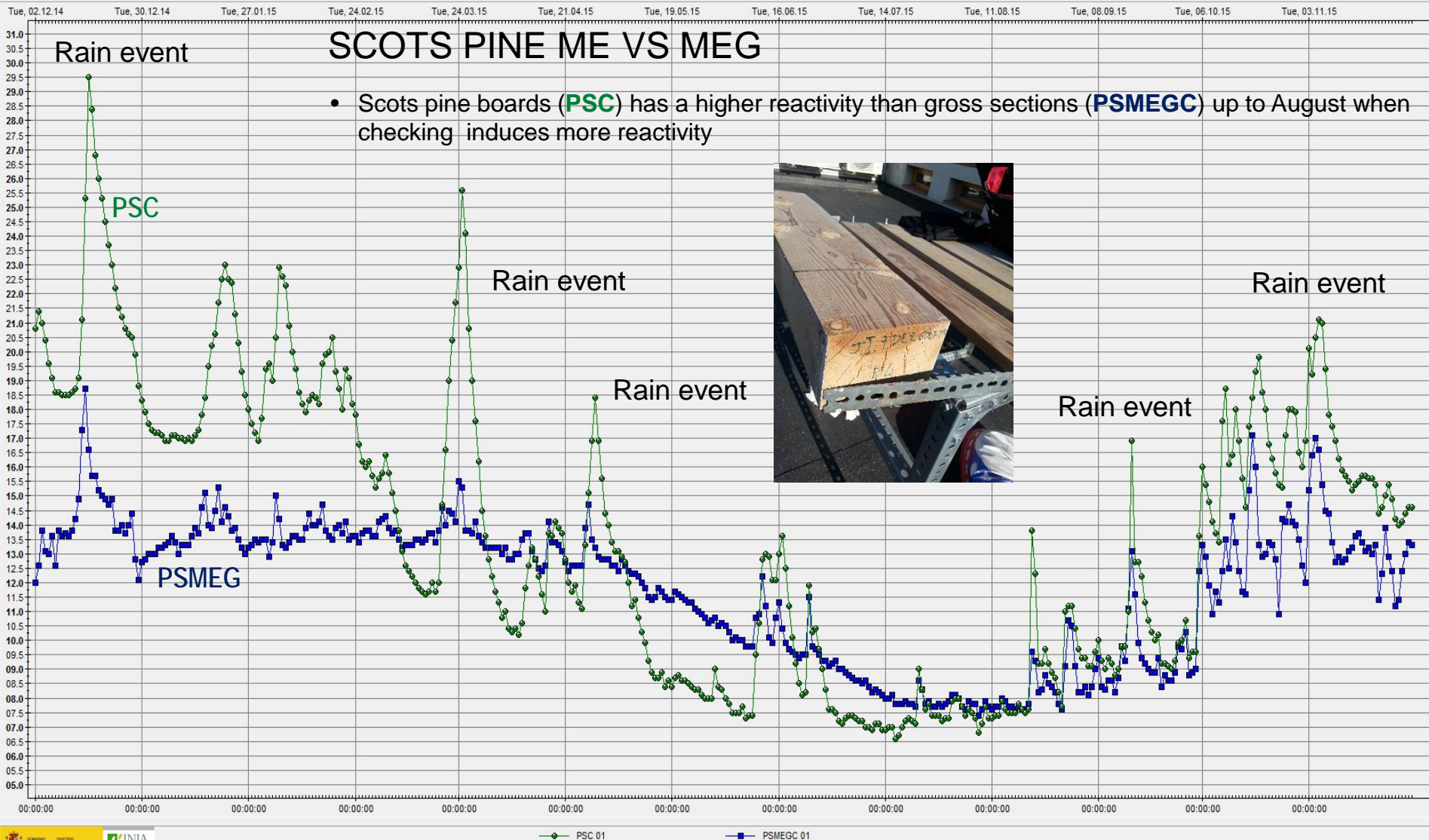
EVOLUTION IN JUNE

- Very early checking in termotreated Wood (PRMTC) acts as wood trapping, so MC after rain events is much higher. MC in dry periods is much lower.
- **Checking in all species induces more reactivity**
- Spruce (**PCC**) maintains a lower MC in dry periods but checking induces reactivity in rain events
- Scots pine (**PSC**) has a higher MC than Radiata pine (**PRC**), being clearly the most reactive species



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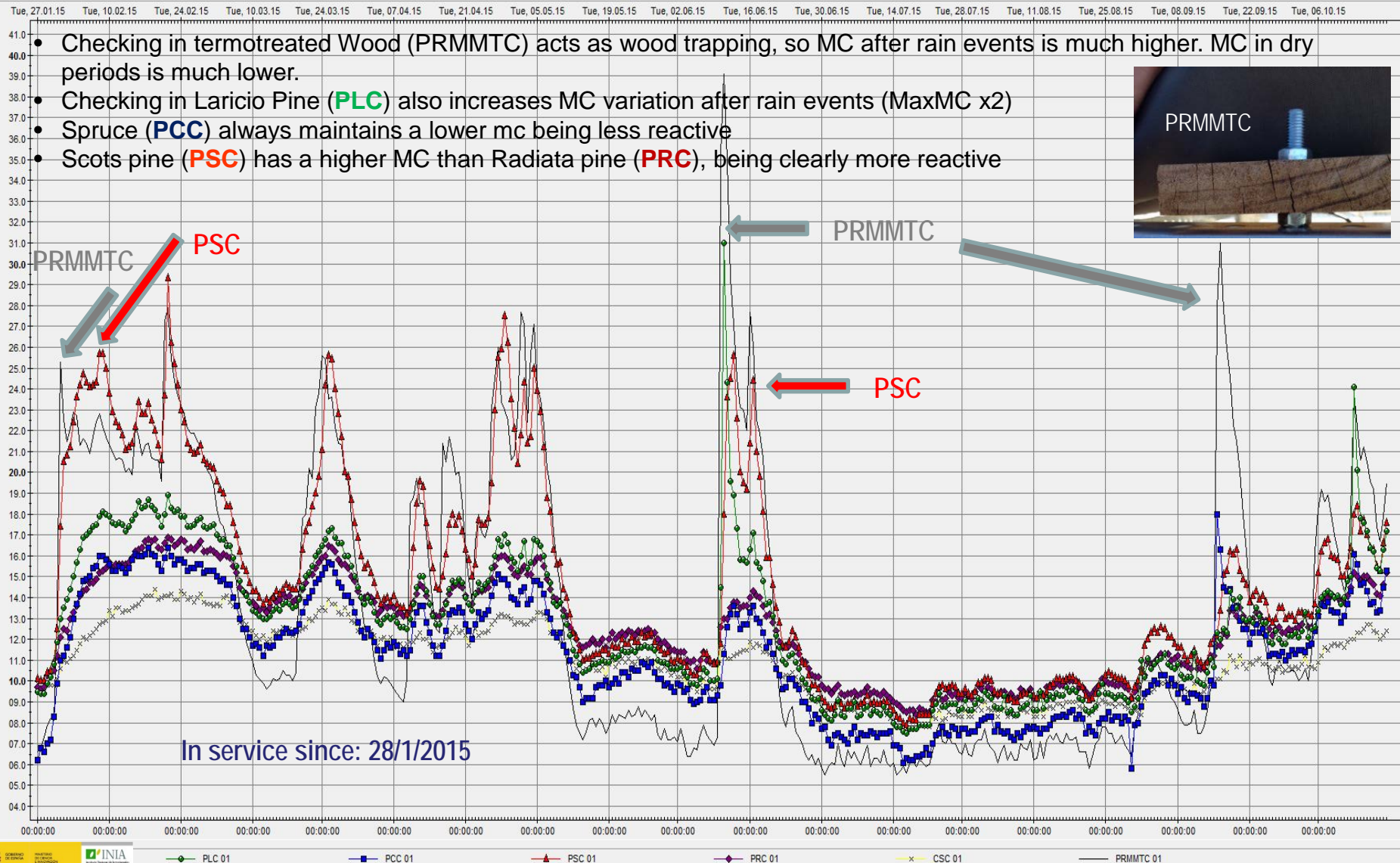
Effect of species: The case of Madrid (Interior, Continental climate)



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Effect of species: The case of Palencia (Interior, Continental climate, cold)

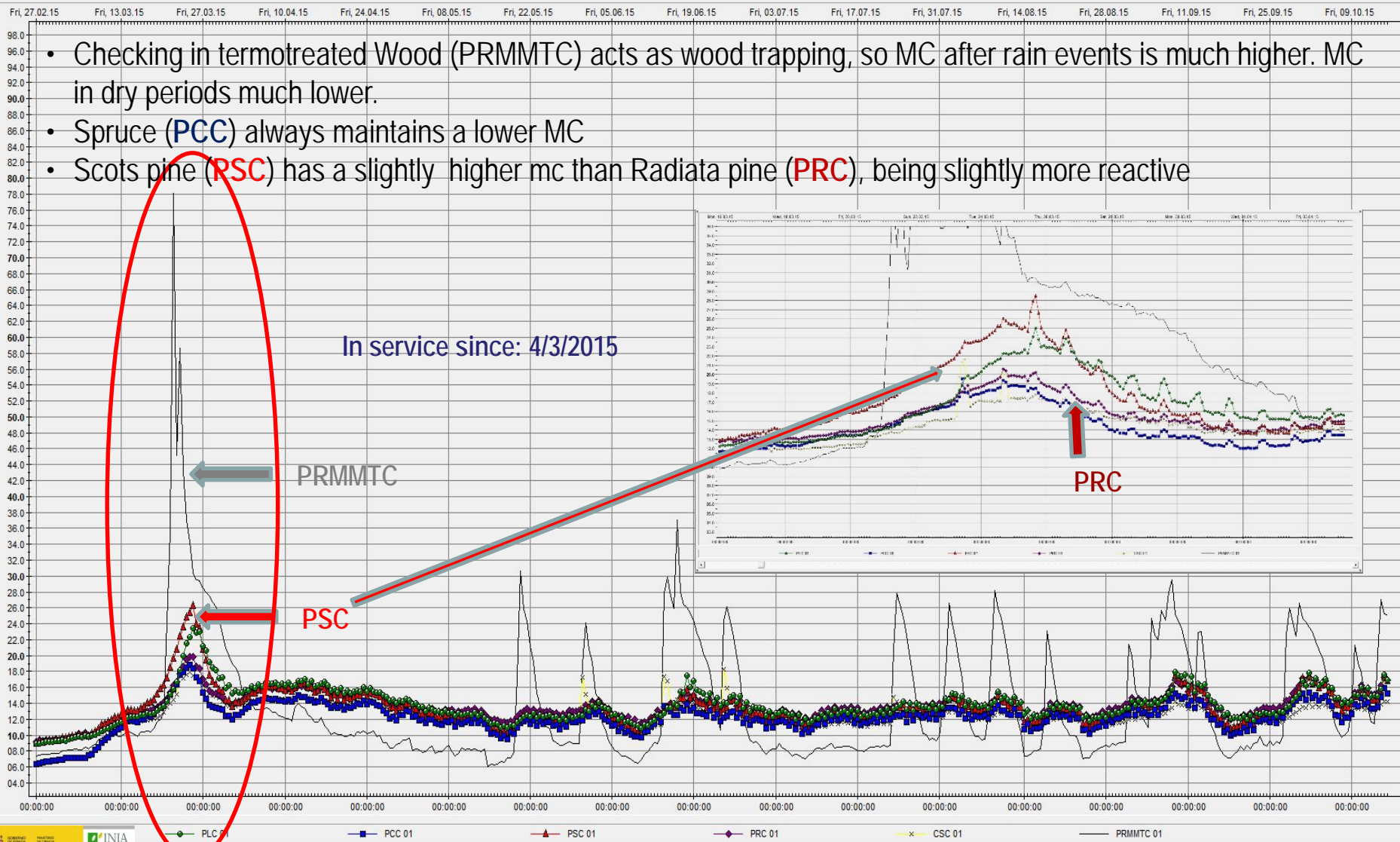
- Checking in termotreated Wood (PRMMTC) acts as wood trapping, so MC after rain events is much higher. MC in dry periods is much lower.
- Checking in Laricio Pine (PLC) also increases MC variation after rain events (MaxMC x2)
- Spruce (PCC) always maintains a lower mc being less reactive
- Scots pine (PSC) has a higher MC than Radiata pine (PRC), being clearly more reactive



Evaluation of functional behavior of wood in outdoor above ground applications (PROY. BIA 2013-42434R)

Effect of species: The case of Valencia (Mediterranean coast, dry and hot summer but high HR)

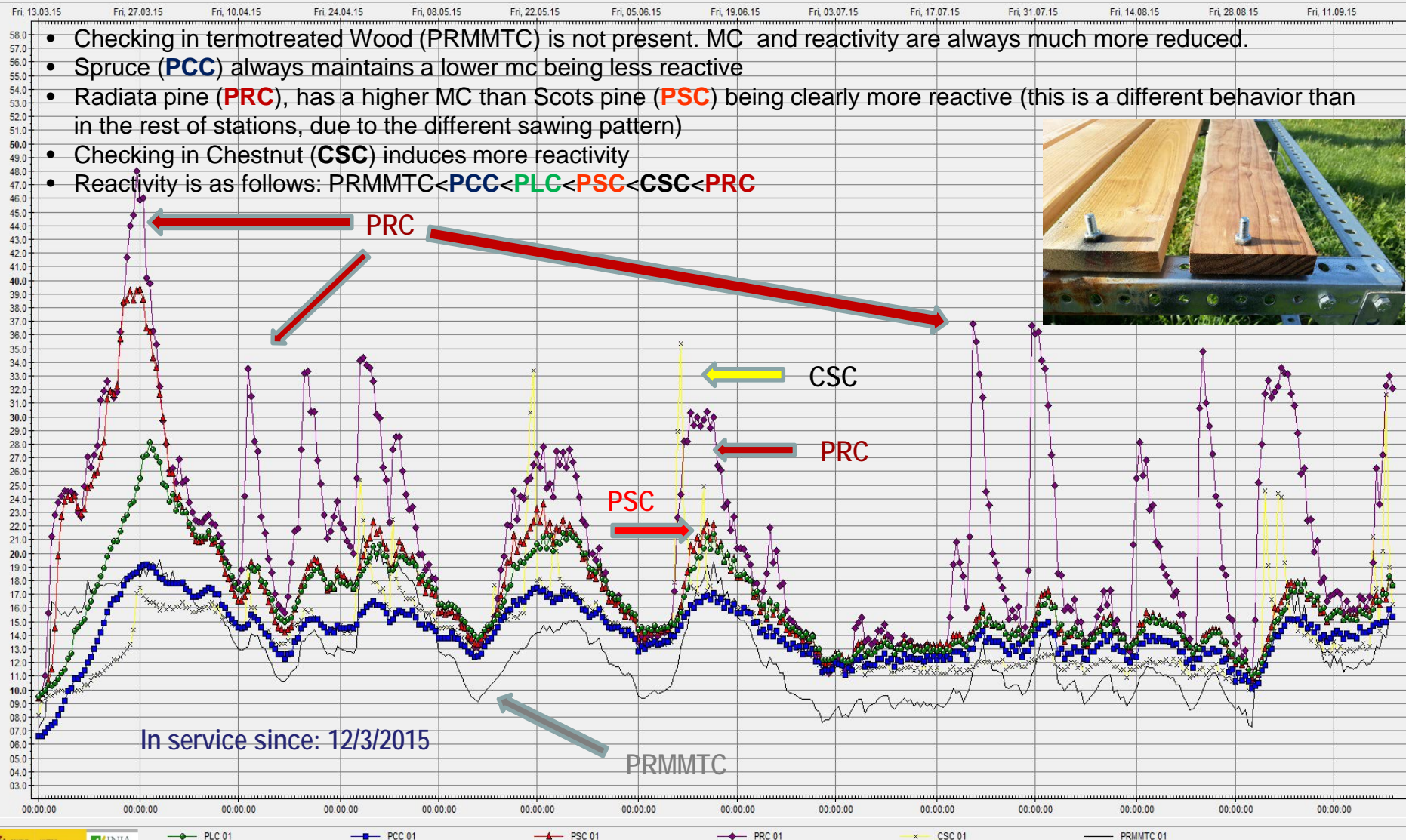
- Checking in termotreated Wood (PRMMTC) acts as wood trapping, so MC after rain events is much higher. MC in dry periods much lower.
- Spruce (PCC) always maintains a lower MC
- Scots pine (PSC) has a slightly higher mc than Radiata pine (PRC), being slightly more reactive



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Effect of species: The case of Vitoria (Interior, Continental climate, strong dew effect, cold)

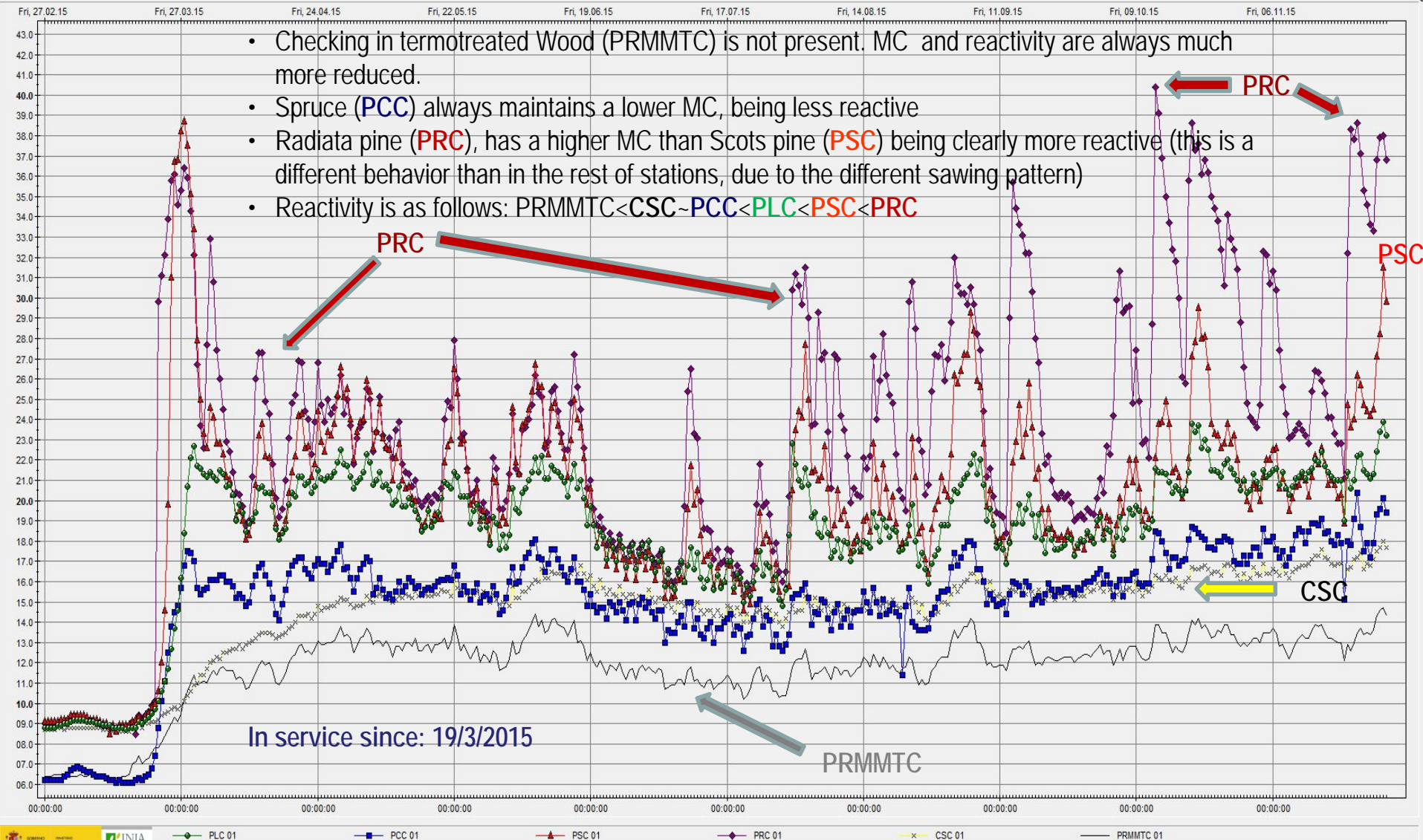
- Checking in termotreated Wood (PRMMTC) is not present. MC and reactivity are always much more reduced.
- Spruce (**PCC**) always maintains a lower mc being less reactive
- Radiata pine (**PRC**), has a higher MC than Scots pine (**PSC**) being clearly more reactive (this is a different behavior than in the rest of stations, due to the different sawing pattern)
- Checking in Chestnut (**CSC**) induces more reactivity
- Reactivity is as follows: $PRMMTC < PCC < PLC < PSC < CSC < PRC$



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Effect of species: The case of Llames (See effect, Atlantic climate)

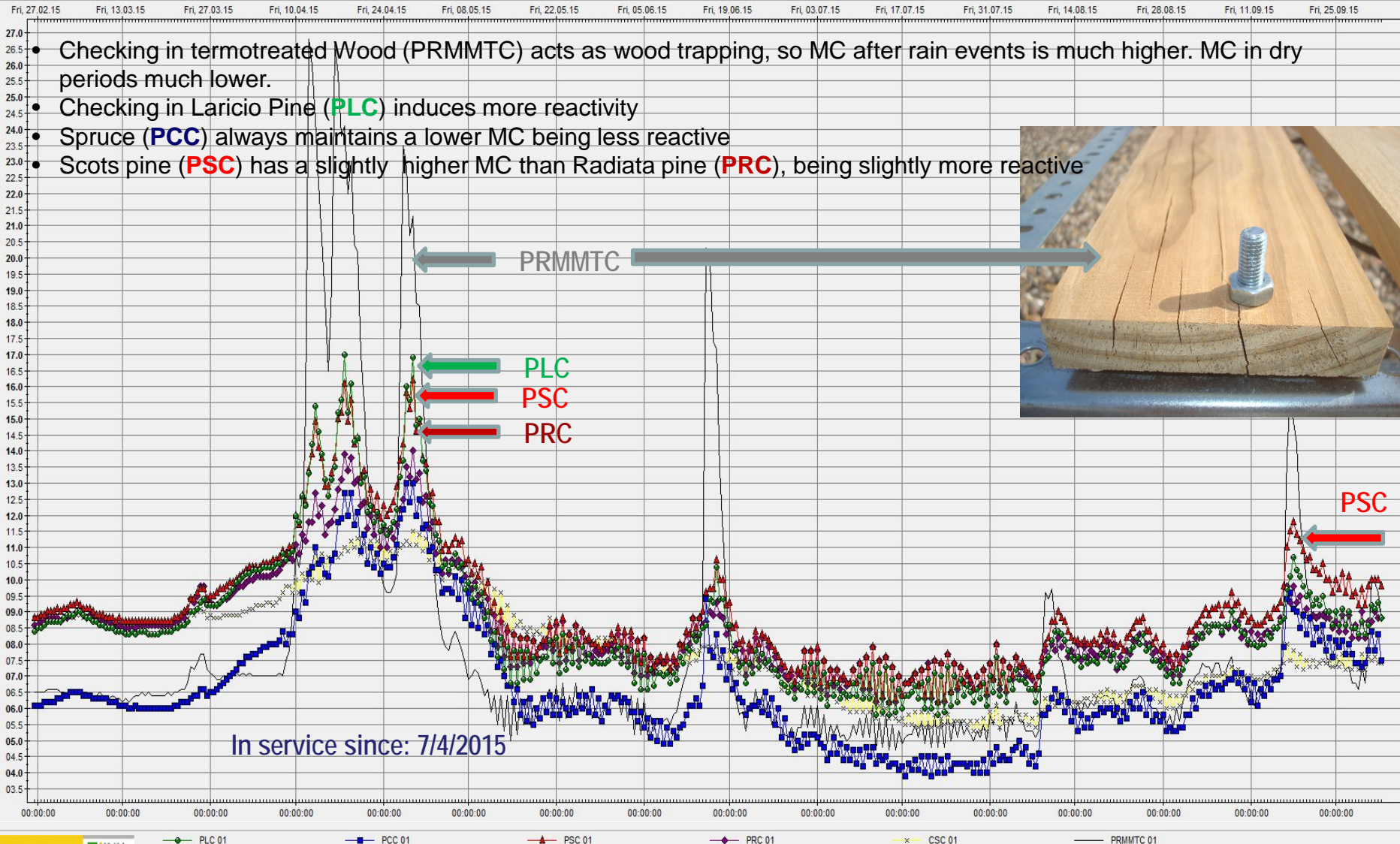
- Checking in termotreated Wood (PRMMTC) is not present. MC and reactivity are always much more reduced.
- Spruce (PCC) always maintains a lower MC, being less reactive
- Radiata pine (PRC), has a higher MC than Scots pine (PSC) being clearly more reactive (this is a different behavior than in the rest of stations, due to the different sawing pattern)
- Reactivity is as follows: PRMMTC < CSC ~ PCC < PLC < PSC < PRC



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Effect of species: The case of Cordoba (Interior, Continental climate, dry and hot summer)

- Checking in termotreated Wood (PRMMTC) acts as wood trapping, so MC after rain events is much higher. MC in dry periods much lower.
- Checking in Laricio Pine (PLC) induces more reactivity
- Spruce (PCC) always maintains a lower MC being less reactive
- Scots pine (PSC) has a slightly higher MC than Radiata pine (PRC), being slightly more reactive



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Effect of species: The case of Huelva (Atlantic coast, dry and hot summer)

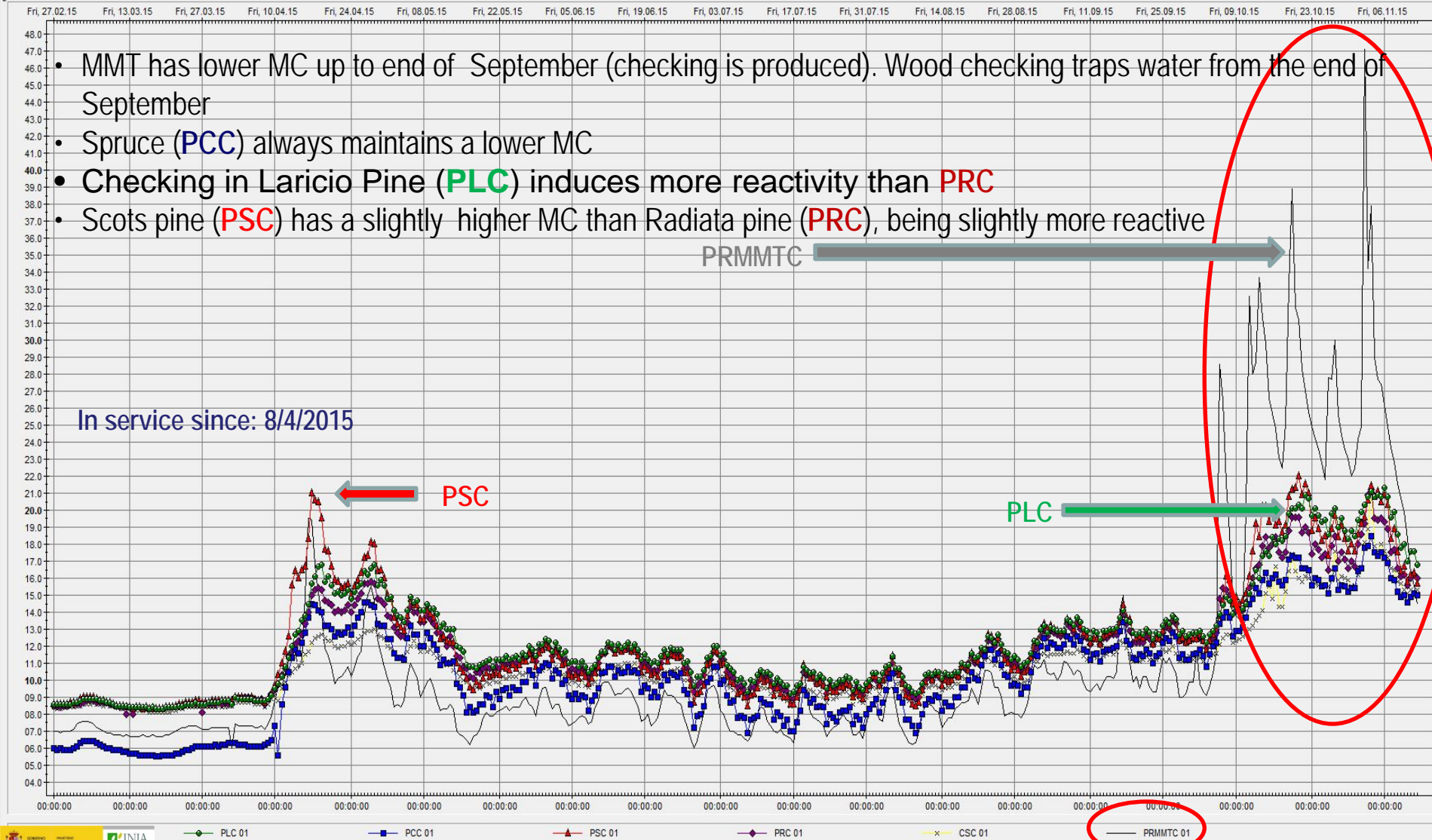
- MMT has lower MC up to end of September (checking is produced). Wood checking traps water from the end of September
- Spruce (PCC) always maintains a lower MC
- Checking in Laricio Pine (PLC) induces more reactivity than PRC
- Scots pine (PSC) has a slightly higher MC than Radiata pine (PRC), being slightly more reactive

PRMMTC

In service since: 8/4/2015

PSC

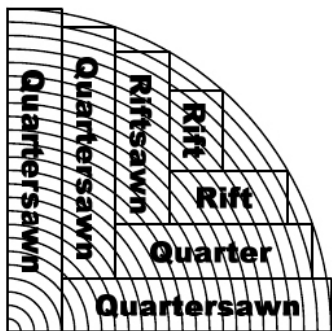
PLC



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Effect of checking, species AND SAWING PATTERN: preliminary conclusions

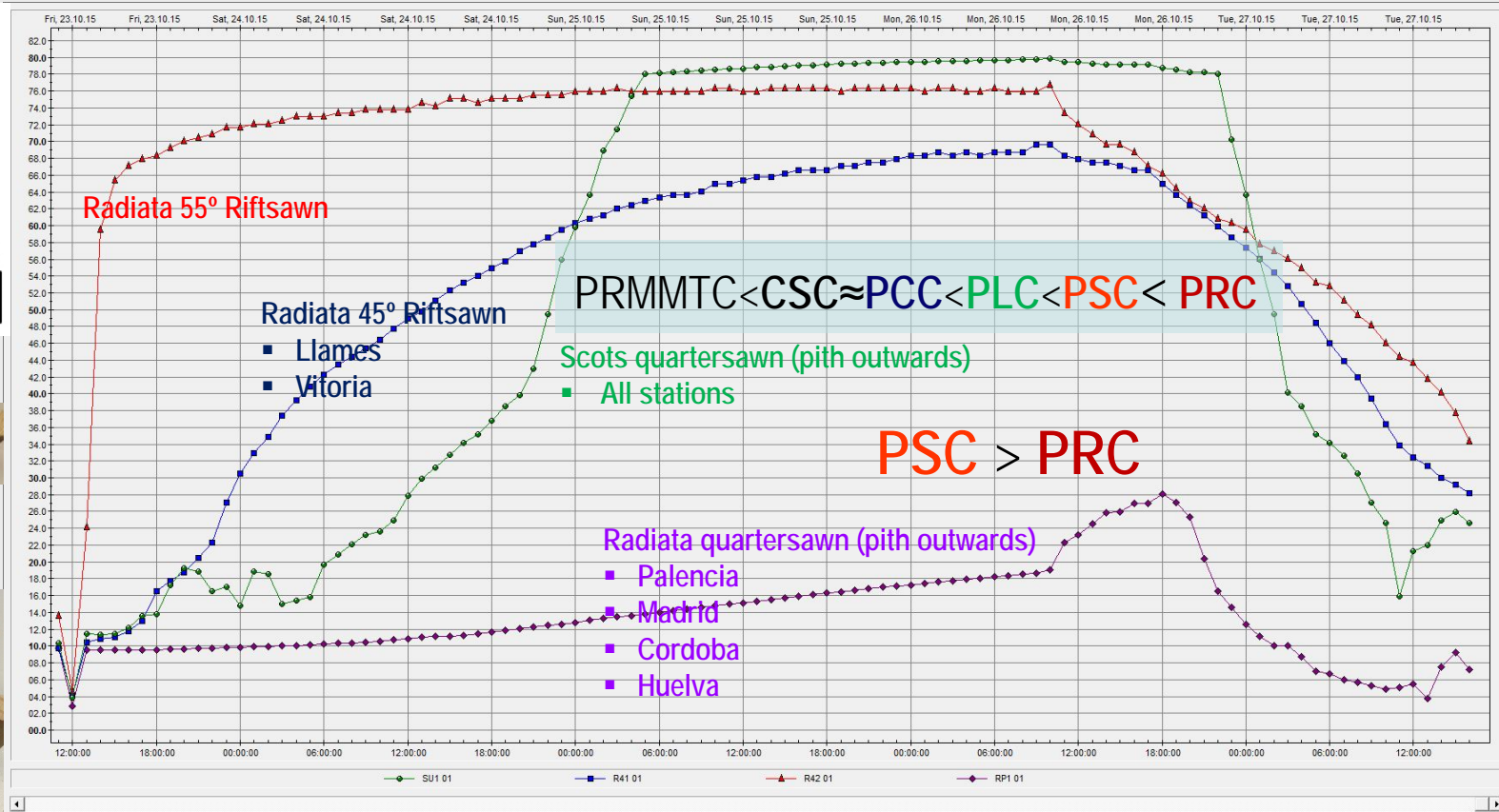
- **Checking** has a big effect on the reactivity of species in rain events, being the most affected the Thermotreated radiata pine.
- Chestnut and Spruce have a similar behavior, being the less reactive except when checking is not present in thermotreated radiata pine (Vitoria&Llames), being then the less reactive
- As general rule, reactivity of the different **species** is as follows: PRMMTC<CSC≈PCC<PLC<(PSC ≈ PRC)?? (if checking is not present)
- Surprisingly Scots and radiata pines have different behavior in two of the sites (Llames&Vitoria) → ¿**Sawing pattern**?



Scots



Radiata



Thank you!!!
to
all those contributing to the project



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