Carbono almacenado al interior del suelo en plantaciones de Coihue y Raulí

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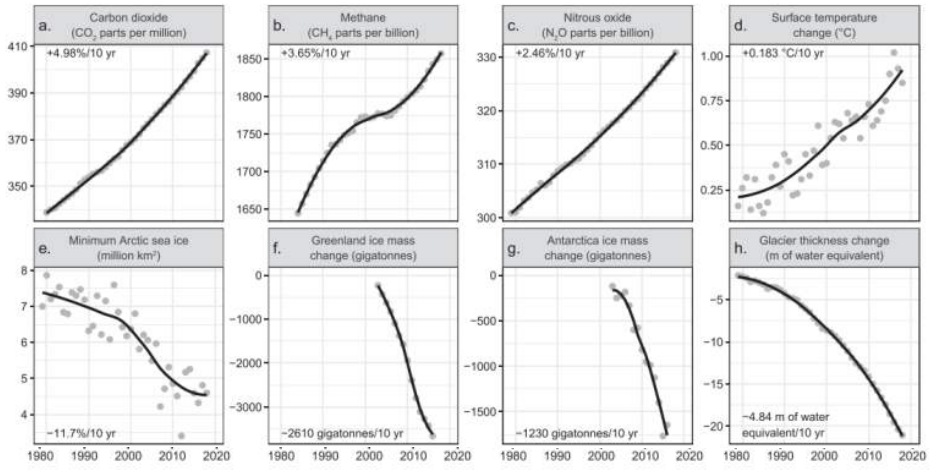
World Scientists' Warning of a Climate Emergency

WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, PHOEBE BARNARD, WILLIAM R. MOOMAW, AND 11,258 SCIENTIST SIGNATORIES FROM 153 COUNTRIES (LIST IN SUPPLEMENTAL FILE S1)

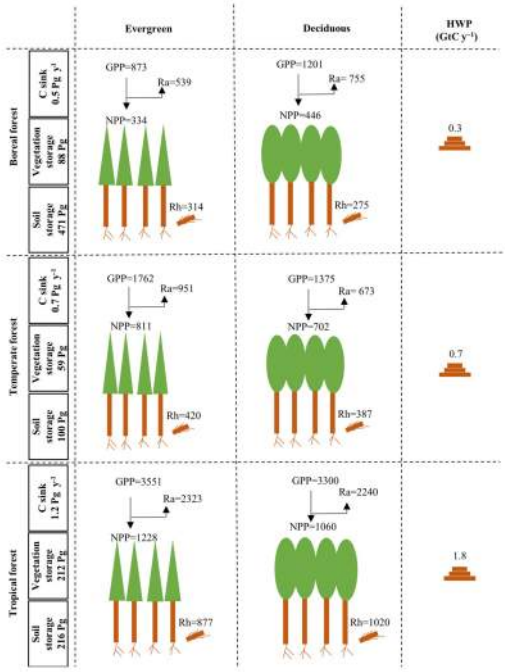


Ripple et al. 2020. *BioScience* 70: 8-12.

Table 3
Estimates of terrestrial carbon stock in world's forest zones (Prentice, 2001)

Biome	Area (Mha)	Terrestrial carbon stock (Pg)			Carbon density (Mg C/ha)	
		Plants	Soil	Total	Plants	Soil
Tropical forests	1.76	340	213	553	157	122
Temperate forests	1.04	139	153	292	96	122
Boreal forests	1.37	57	338	395	53	296
Total	4.17	536	704	1240	–	–

Lal 2005. Forest Ecology and Management 220: 242-258.



Ameray et al 2021. Current Forestry Reports 7: 245-266.

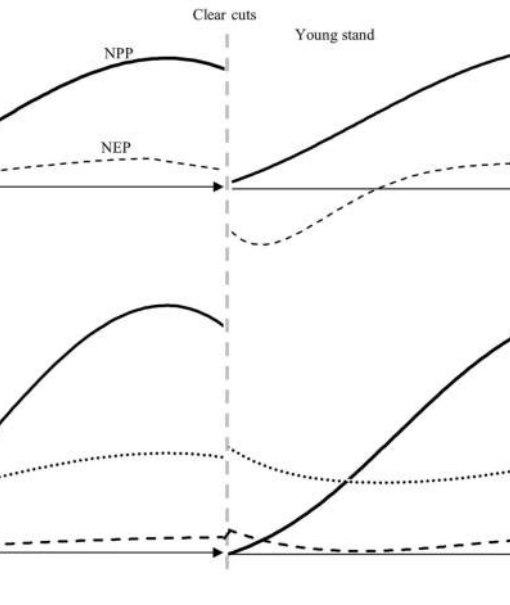


Fig. 3 Theoretical C stock and flux changes of a forest ecosystem following a stand-replacing disturbance event (clear-cut), [18][30] adapted from Goulden et al. and Liu et al. with the changes in net primary productivity (NPP) and net ecosystem productivity (NEP)

Ameray et al., 2021. Current Forestry Reports 7: 245-266.

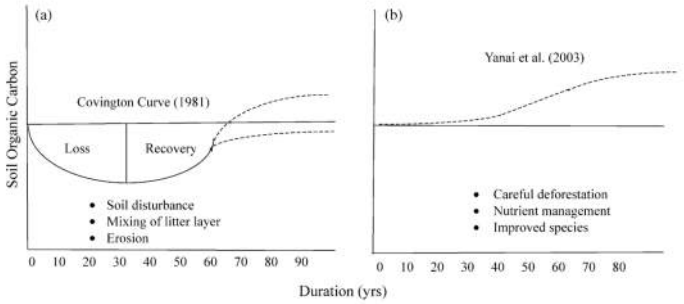
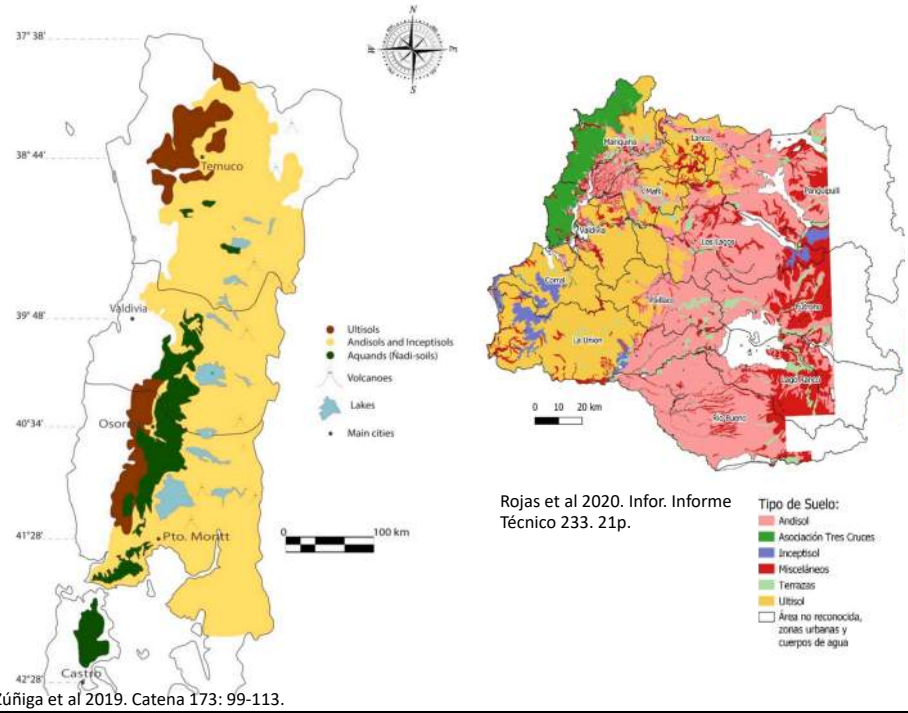


Fig. 2. A schematic showing the effects of timber harvest and logging on soil organic carbon stock (a) with soil disturbance and mixing of litter layer and mineral soil and (b) without soil disturbance and adoption of improved management practices.

Lal 2005. Forest Ecology and Management 220: 242-258.



Rojas et al 2020. Infor. Informe Técnico 233. 21p.

Zúñiga et al 2019. Catena 173: 99-113.

Haloisita

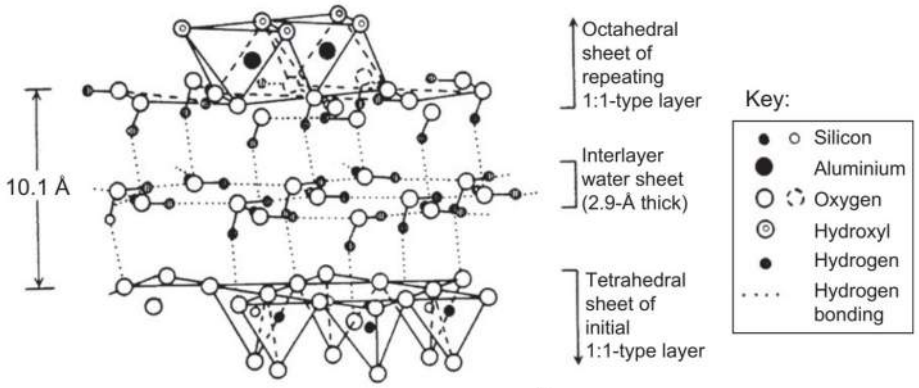


FIGURE 1.7 Diagrammatic sketch of the halloysite-(10Å) structure as proposed by Hendricks and Jefferson (1938) showing the presence in the interlayer space of a single sheet of water molecules interacting with each other and with opposing silicate layers through hydrogen bonding. Modified after Grim (1968).

Theng 2012. Developments in Soil Science 4: 3-45.

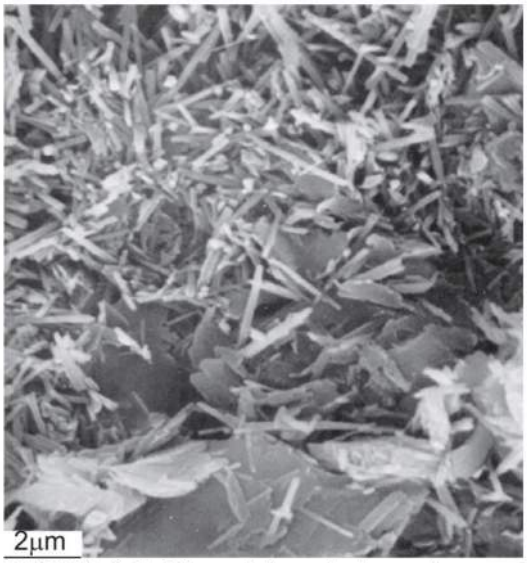


FIGURE 1.8 Transmission electron micrograph of tubular halloysite from Sasso (Italy). The sample also contains some platy kaolinite particles. From Bergaya and Lagaly (2006).

Theng 2012. Developments in Soil Science 4: 3-45.

Alofán

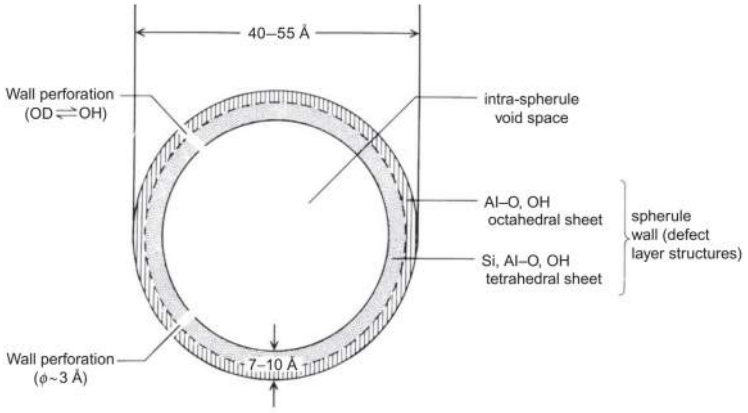


FIGURE 1.18 Diagram of a unit particle of allophane, showing a hollow spherule with an outer diameter of 40–55 Å and a wall thickness of 7–10 Å. The defective spherule wall contains perforations of ~3 Å in diameter where (OH)Al(H_2O) groups are exposed, allowing exchange of hydrogen with deuterium. *Note*: 1 Å=0.1 nm. Modified after Wada and Wada (1977).

Theng 2012. Developments in Soil Science 4: 3-45.

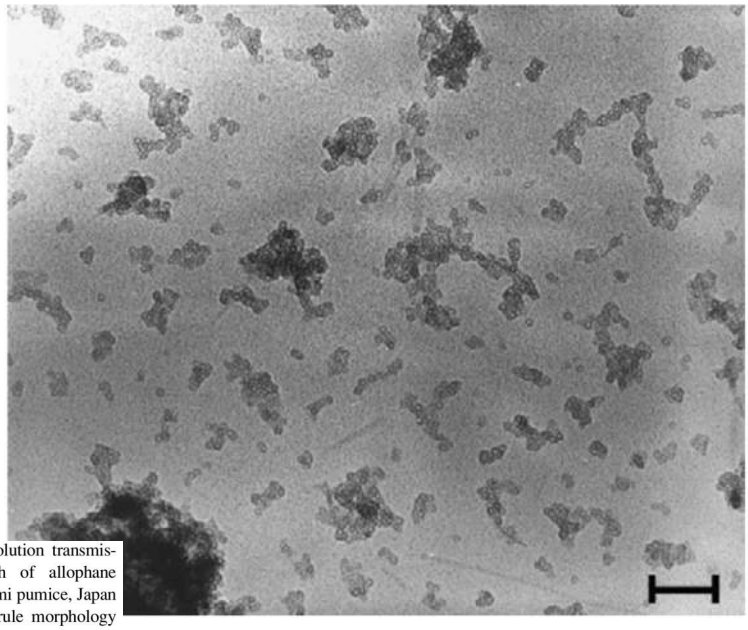
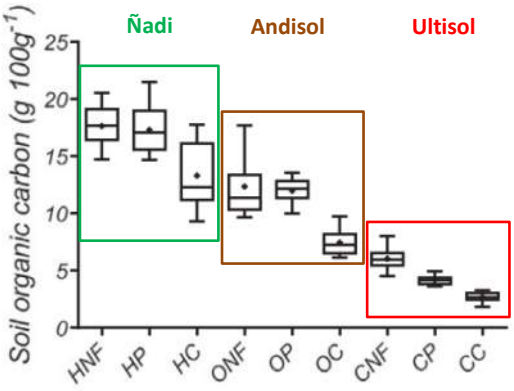


FIGURE 1.16 High-resolution transmission electron micrograph of allophane separated from the Kitakami pumice, Japan showing the hollow spherule morphology of the unit particles. Bar=50 nm. Courtesy: S.-I. Wada, Kyushu University, Japan.

Theng 2012. Developments in Soil Science 4: 3-45.

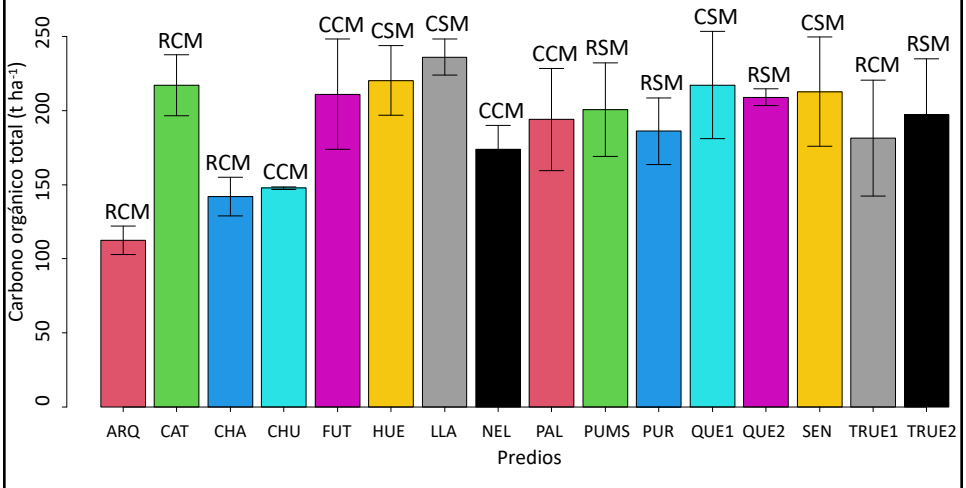


NF=Bosque nativo secundario (Roble-Laurel-Arrayán-Luma)
P=Pradera (mixta de 10 años)
C=Cultivo (brásicas, trigo, avena)

Valle y Carrasco 2018. Catena 162: 386-395.

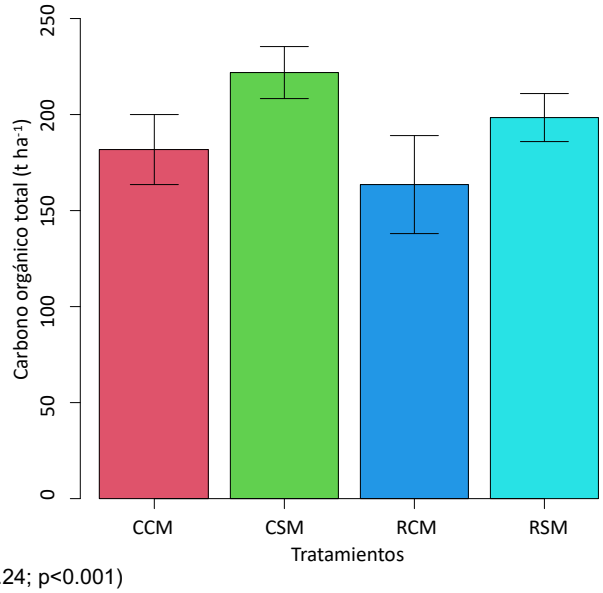
¿Cómo afectan las plantaciones de Coihue y Raulí la acumulación de carbono al interior del suelo en el sur de Chile?

Carbono total en distintos predios



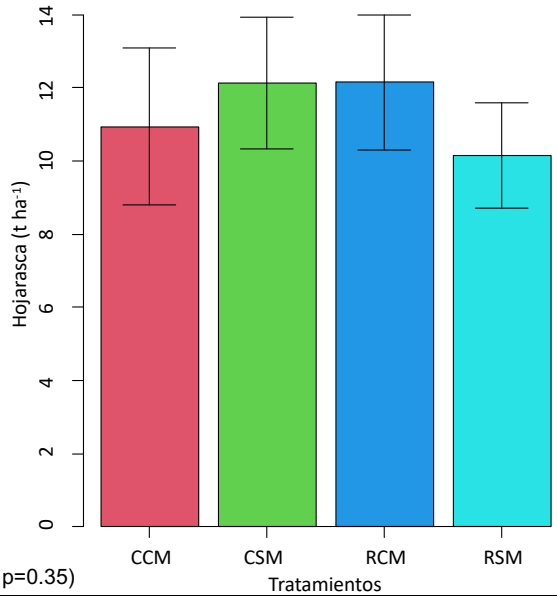
ANOVA ($F_{15,32}$=5.94; p<0.001)

Carbono total según manejo



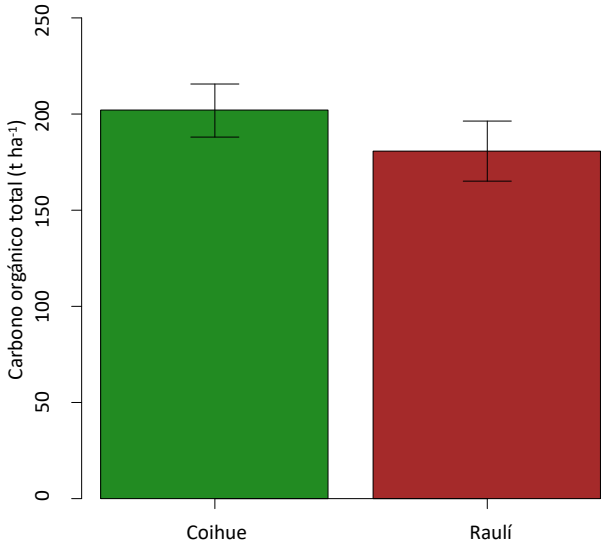
ANOVA ($F_{3,44}$=7.24; p<0.001)

Hojarasca según manejo



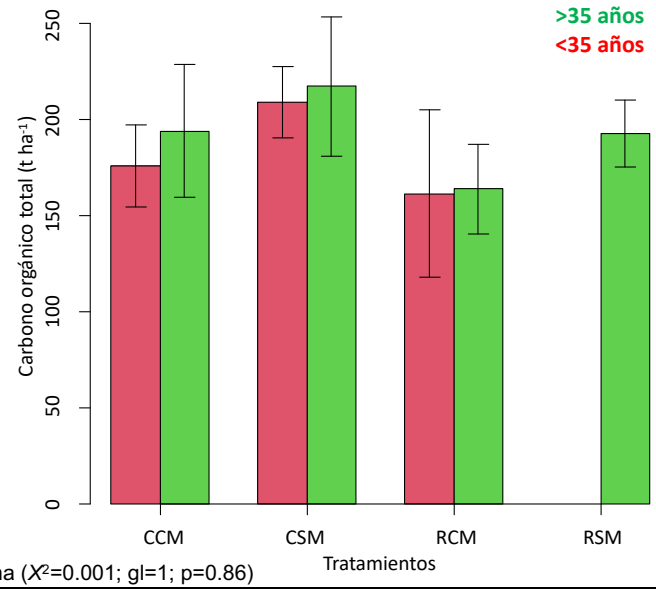
ANOVA ($F_{3,44}$=1.11; p=0.35)

Carbono total y especies nativas



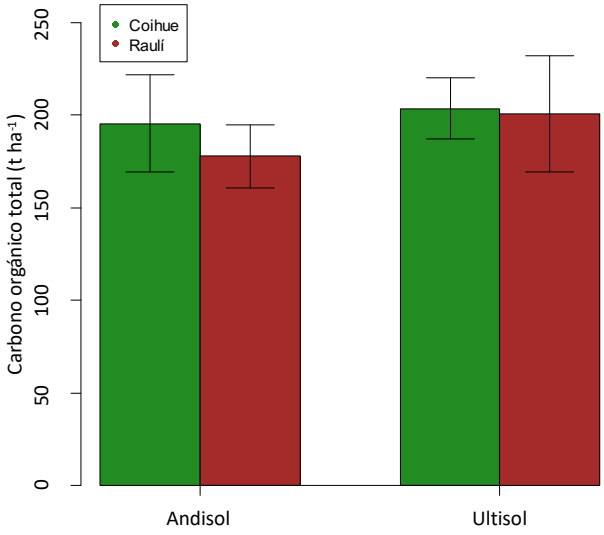
GLM Gamma (X^2=0.14; gl=1; p=0.05095)

Carbono total y edad de plantaciones



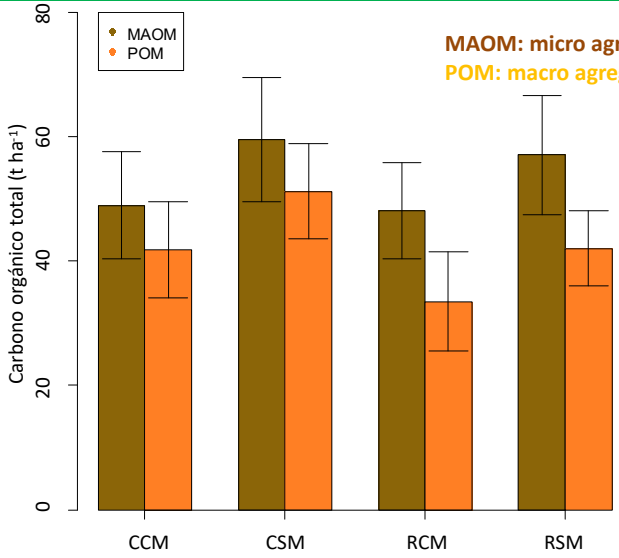
GLM Gamma (X^2=0.001; gl=1; p=0.86)

Carbono total y tipo de suelo



ANOVA ($F_{1,45}$=0.97; p=0.33) suelo
ANOVA ($F_{1,45}$=3.89; p=0.055) sps

Cantidad de carbono por fracción y manejo



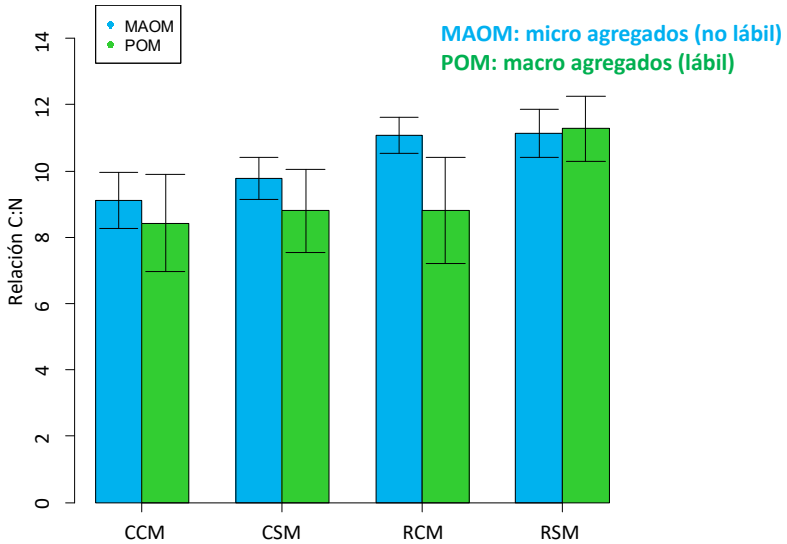
GLM Gamma (X^2=2.43; gl=3; p<0.01) manejo
GLM Gamma (X^2=2.67; gl=1; p<0.001) fracción

Cantidad de carbono por fracción y profundidad de suelo

Tratamiento	MAOM (t ha^{-1})	POM (t ha^{-1})
CCM.A	33.17 ± 2.21	35.25 ± 4.52
CCM.B	64.84 ± 5.41	48.46 ± 6.02
CSM.A	38.91 ± 2.70	38.13 ± 4.43
CSM.B	80.33 ± 4.79	64.36 ± 3.47
RCM.A	31.74 ± 2.06	27.17 ± 3.03
RCM.B	64.53 ± 3.44	39.80 ± 7.25
RSM.A	36.46 ± 1.67	30.49 ± 2.78
RSM.B	77.74 ± 4.56	53.65 ± 2.90

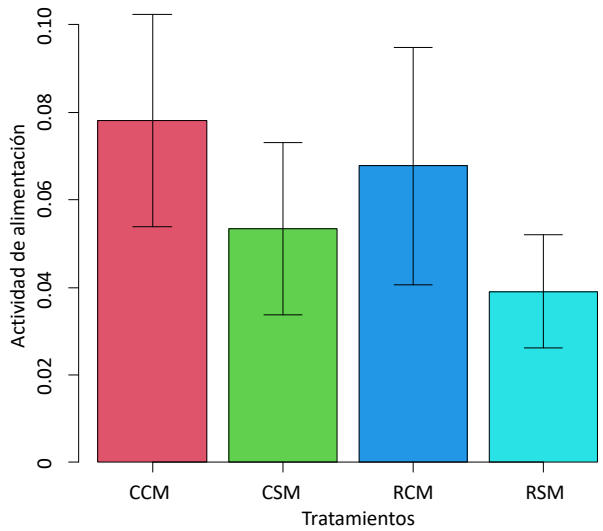
GLM Quasibinomial (X^2=2.79; gl=1; p<0.001)

Relación C:N por fracción y manejo



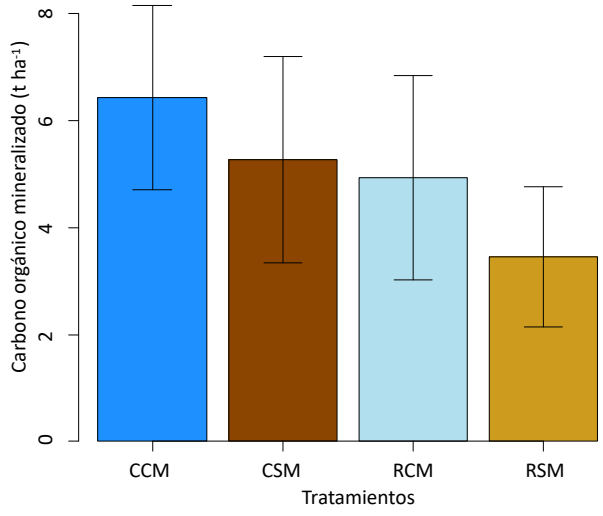
GLM Gamma (X^2=1.62; gl=3; p<0.001) manejo
GLM Gamma (X^2=0.45; gl=1; p<0.05) fracción

Actividad total de micro y meso fauna por manejo



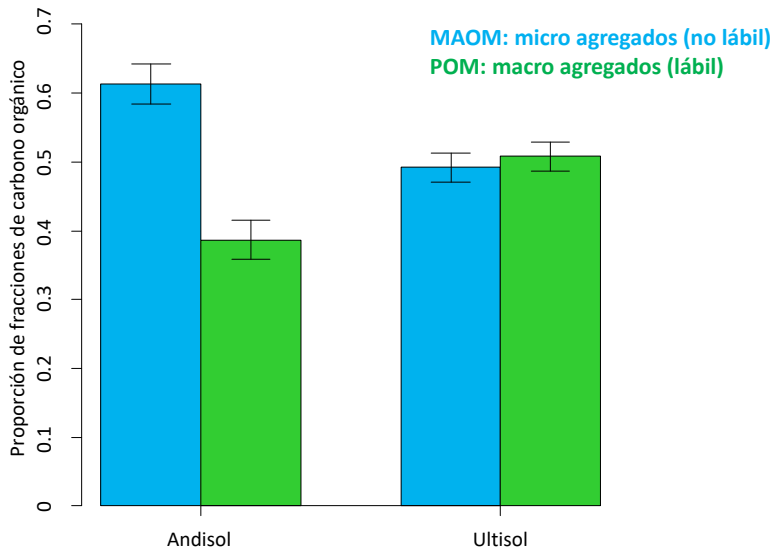
GLM Quasibinomial (X^2=0.38; gl=3; p=0.052)

Mineralización de carbono total por manejo



GLM Gamma (X^2=4.64; gl=3; p=0.11)

Fracciones de carbono y tipo de suelo



GLM Quasibinomial (X^2=2.82; gl=1; p<0.001)

En resumen

- Alta variabilidad de carbono total entre sitios.
- Plantaciones sin manejo presentan mayor cantidad de carbono total.
- Actividad biológica muestra una tendencia a aumentar con manejo.
- Raulí acumula mas carbono en el suelo que Coihue.
- Andisol acumula mas que Ultisol.

Muchas gracias por su atención

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