Irrigation impact on precipitation in WRF simulations during LIAISE campaign

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Introduction

- Irrigation induces changes in thermodynamic air properties -> circulation dynamics, changes in moisture and heat (ex: CAPE)
- Irrigation increases the precipitation accumulated over the region of Po Valley (Valmassoi et al 2019)

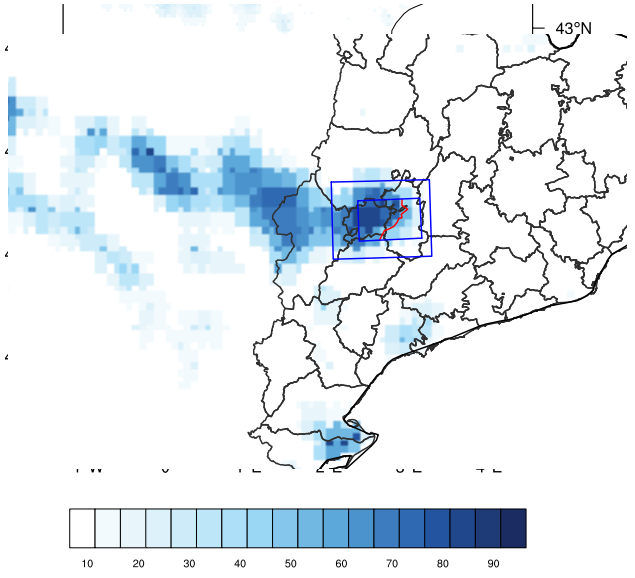
Objectives

- Explore the impact of different irrigation parameters in precipitation accumulation and distribution
- Impact on Irrigated vs rainfed areas
- Differences in stratiform vs convective fraction of precipitation

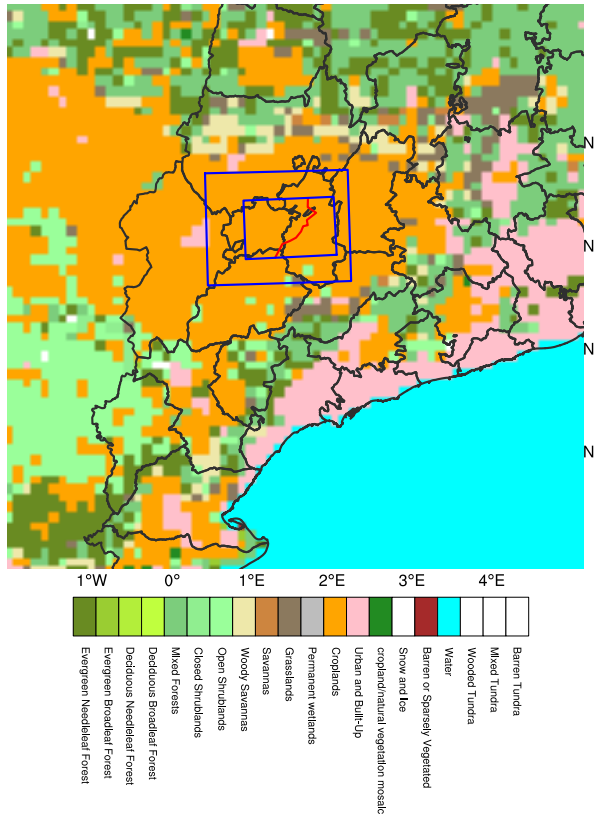
Methodology

- WRF Version 4.3
- Irrigation parameterization: 3 different evaporative processes (1=Channel, 2=Drip, 3=Sprinkler)
- Initial and boundary conditions: ERA5 every hour
- Period: July 2021
- Domains 9 km, **3 km**

Irrigated land percentage



Land use

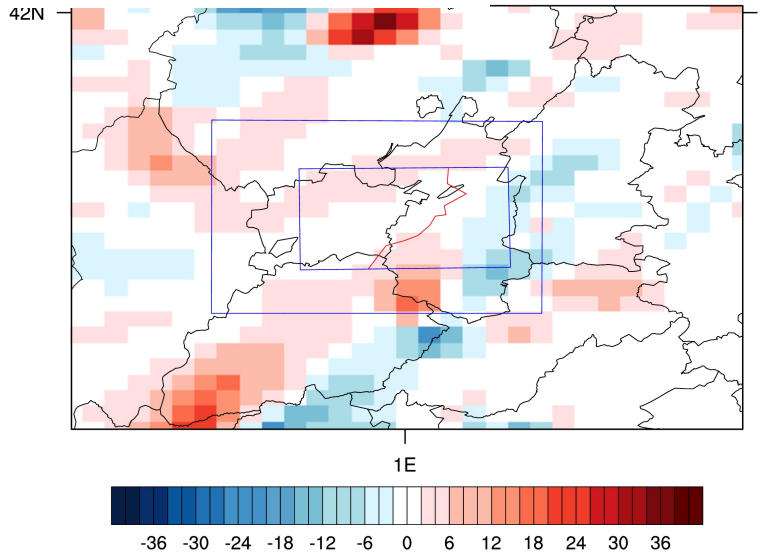


Results

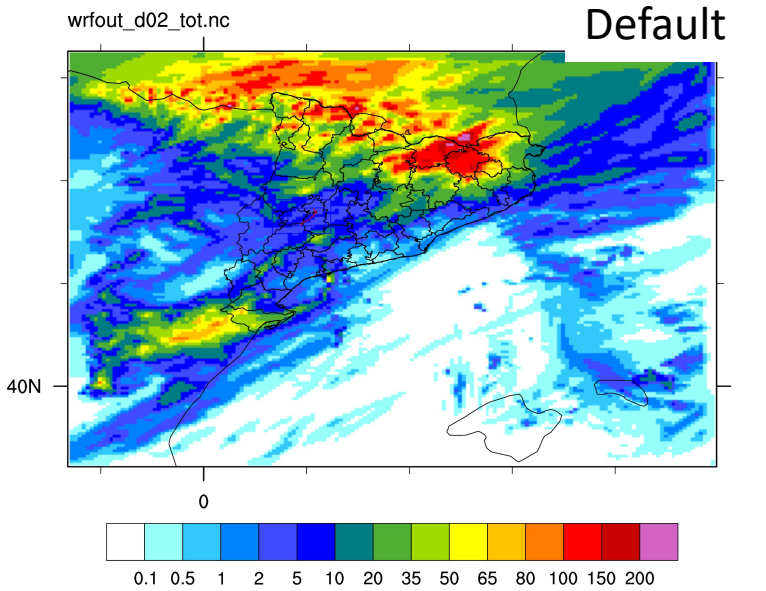
Name	Irrigation param.	Irrigated amount	Hours	Accumulated ppt domain (3 km) [mm/km^2]	Fractional area > 10 mm/h [píxels/total pixels]
Default	-	-	-	1.54 mm/km^2	0.116
Irr1	1	5.7 mm/day	6-18 h	1.60 mm/km^2	0.120
Irr1_x10	1	57 mm/day	6-18 h	1.74 mm/km^2	0.154
Irr1_night	1	5.7 mm/day	18-6h	*To be done*	*To be done*
irr2	2	5.7 mm/day	6-18 h	*To be done*	*To be done*

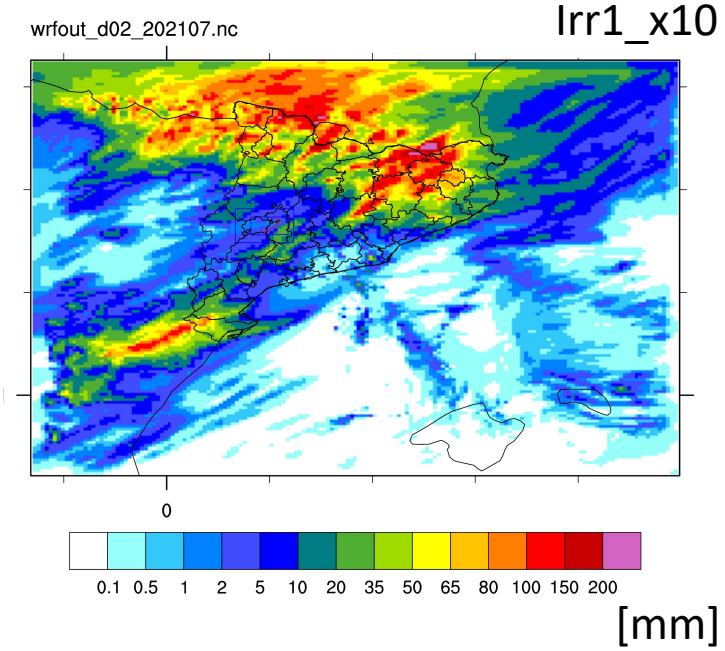
Accumulated precipitation difference (July)

Default - Irr1

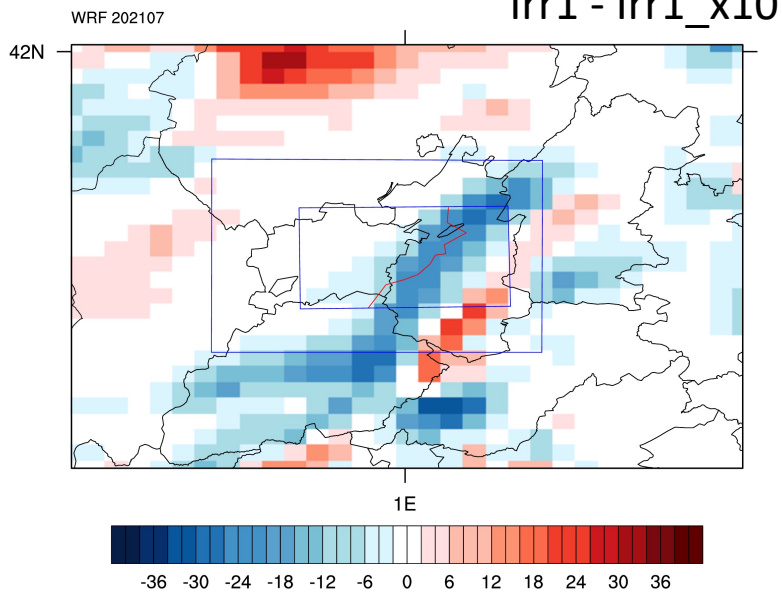


Accumulated precipitation (July)





Irr1 - Irr1_x10



Some data needed for irrigation parameterization:

Days of irrigation and/or frequency
Amount of irrigated water (mm/day)
Hours of irrigation (starting, finishing)
Number of consecutive days of irrigation

How can we estimate these values **?**