

# Immersive Forest: Using VR to communicate the impacts of climate change and management practices on future forests

Irina Cristal<sup>1,3</sup>, Cristina Vega-Garcia<sup>2</sup>, Jose Ramon Gonzales<sup>1</sup>, Jordi Garcia-Gonzalo<sup>1</sup>

<sup>1</sup>Science and Technology Center of Catalonia (CTFC) <sup>2</sup>University of Lleida (UdL) <sup>3</sup>Forest Bioengineering Solutions (FBS)

## Background



Climate change affects substantially how forests contribute to climate mitigation


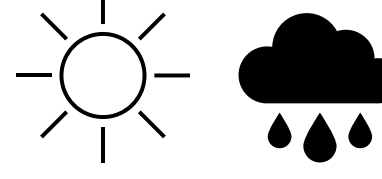
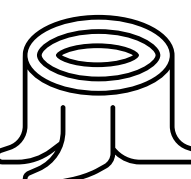
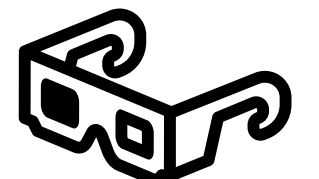
Future forestry experts need practical learning tools to better understand climate change impact on forests

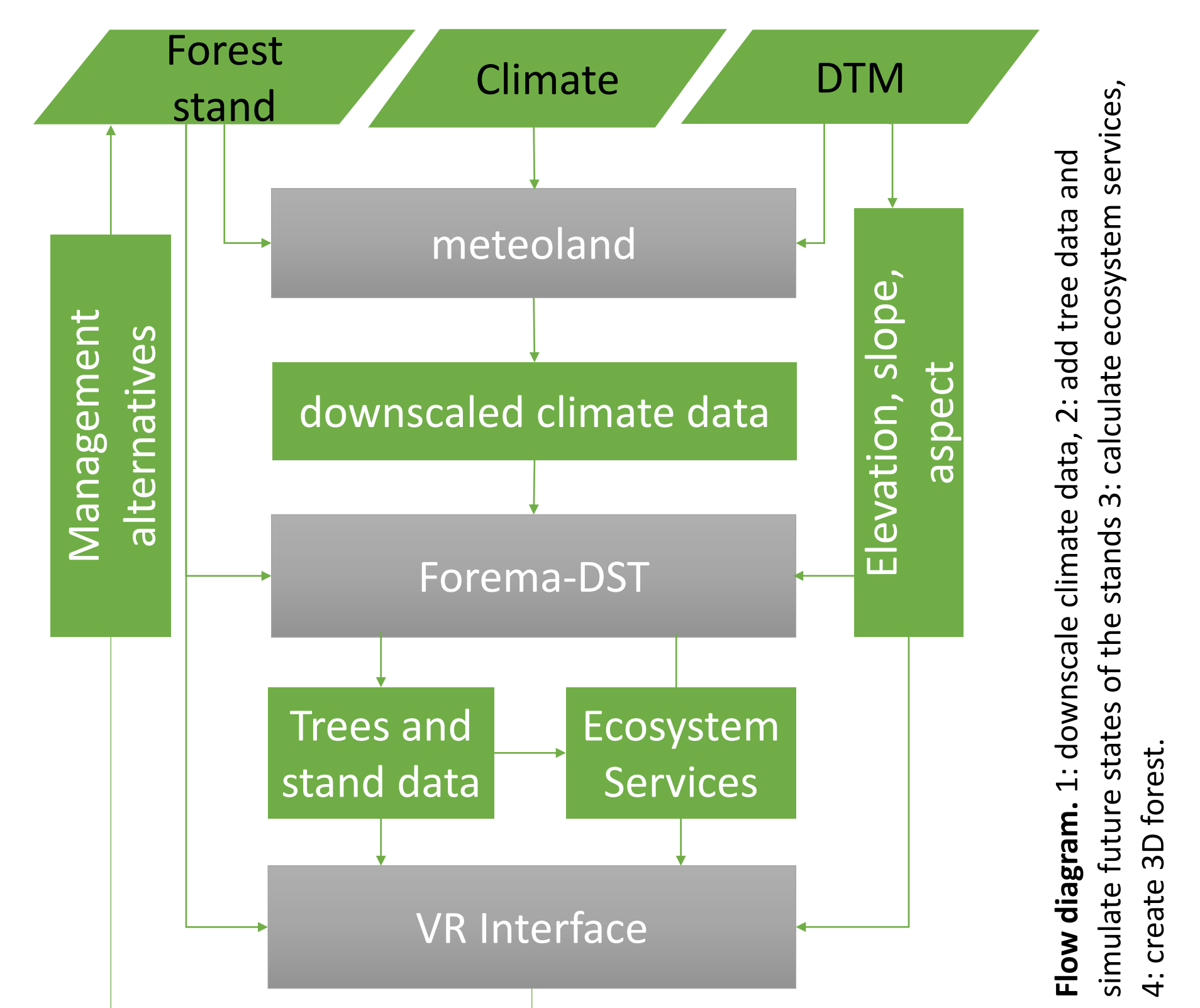
3D visualization and Virtual Reality can help scientific knowledge transfer and enhance learning in forest management.

## Goal

Develop a dynamic **3D forest simulator**, which will enable forestry students to explore how different **forest management alternatives** can improve the **resilience** of forests to **climate change**.

## Approach

 <b>Forest stands:</b>  climatic gradient of Catalonia, Spain  Source: National Forest Inventory	 <b>Climate change:</b>  Scenarios RCP 4.5 and RCP 8.5  downscaling: meteoland	 <b>Management:</b>  <ul style="list-style-type: none"> <li>• No thinning</li> <li>• Light thinning</li> <li>• Heavy thinning</li> </ul> Simulation: Forema-DST	 <b>Visualization:</b>  3D scenes based on tree characteristics  Modelling: x3d, Unity
--	--	---	--



## Results

- Representative forest stands along the climatic gradient of Catalonia, Spain, projected 100 years into the future
- Scenarios were based two climate change projections and increasing thinning intensities.
- The VR application allows exploring the impacts of management prescriptions and climate change scenarios on both individual trees and forest ecosystem services.



Intensive thinning, after 15 years of simulation



No thinning, climate change scenario based on RCP 4.5



Light thinning, climate change scenario based on RCP 8.5

## Conclusion

Our approach can serve as an excellent exercise for forest management practitioners and forestry students.

While we specifically focused on its educational potential, the VR tool can facilitate communication among experts and the public on effects of climate change on forested areas.