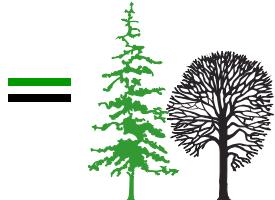




The role of forest type on throughfall during extreme precipitation events

– a comparison of methods using data from the Pohorje mountains (NE Slovenia)

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Gozdarski inštitut Slovenije
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European Geosciences Union General Assembly 2013,
Vienna, Austria, 07 – 12 April 2013



The role of forest type on throughfall during extreme precipitation events

OUTLINE

How did the conversion of forest from spruce monocultures into mixed deciduous-coniferous forests changed the throughfall amount?

1. Occurance of extreme precipitation events in the Pohorje mountains
2. Comparison of throughfall in coniferous and mixed deciduous-coniferous forest stands
3. Conclusions



Extreme precipitation event in November 2012 in the Pohorje mountains

Headwaters of River Oplotnica



River Oplotnica, November 2012



<https://sites.google.com/site/janjanetricbuu/o-meni>

River Drava, November 2012, a 100-year return period



<http://www.dnevnik.si/kronika/>





The Pohorje mountains in NE Slovenia

MATERIALS AND METHODS

- Alpine biogeographic zone
- Area: 259,4 km²
- Altitude: 1543 m a.s.l.
- Annual precipitation: 1600 mm
- 89,3% forest cover: intensive forestry

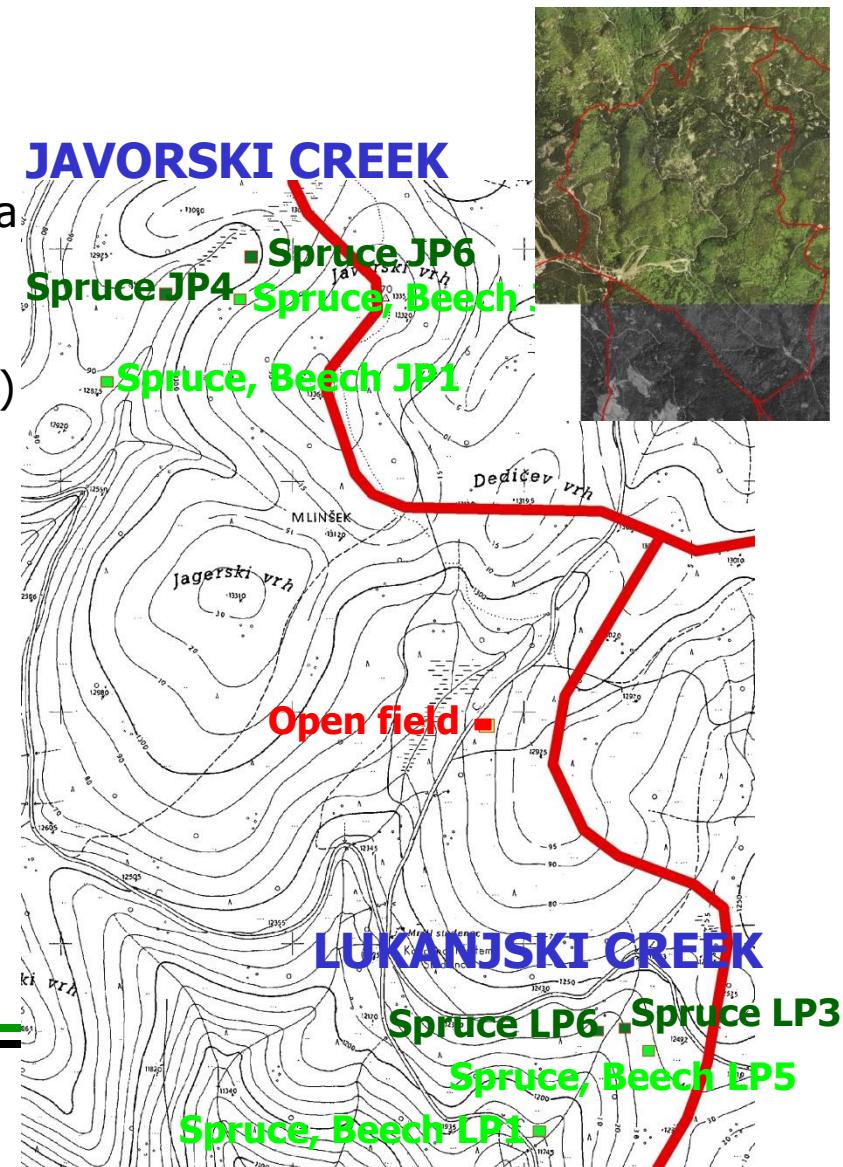




Coniferous and mixed deciduous-coniferous stands

MATERIALS AND METHODS

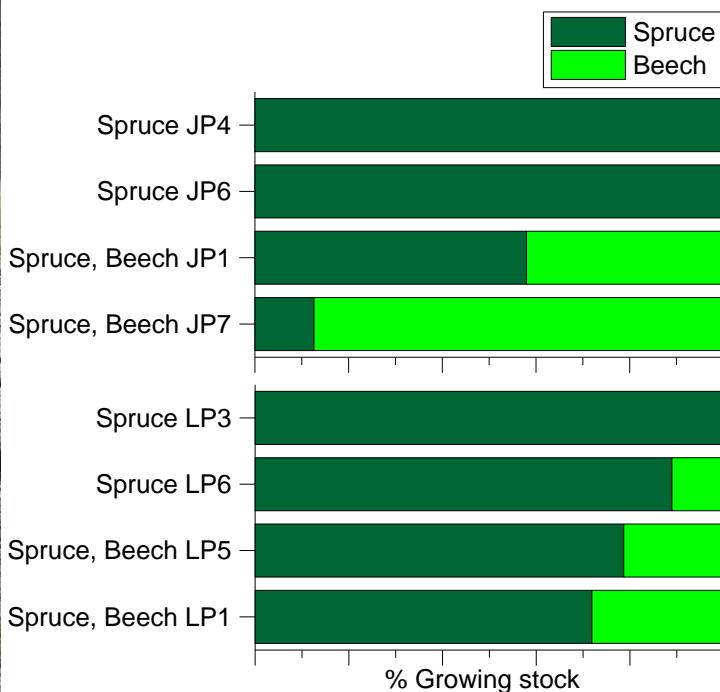
- The upper catchment of Oplotnica river
- Dominant tree species:
 - Spruce - *Picea abies* (L. Karst)
 - Beech - *Fagus sylvatica* (L.)
- Prevailing forest plant communities:
 - *Cardamine Savensi Fagetum*
 - *Sphagno - Piceetum*
 - *Bazzanio - Piceetum*
- Prevailing soil units:
 - *District cambisols*
 - *District Ranker*





Coniferous and mixed deciduous-coniferous forest stands

MATERIALS AND METHODS



JAVORSKI CREEK

Spruce JP6

Spruce, Beech JP7

Spruce, Beech JP1

Open field

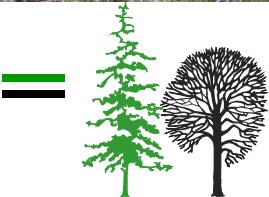
LUKANJSKI CREEK

Spruce LP6

Spruce LP3

Spruce, Beech LP5

Spruce, Beech LP1

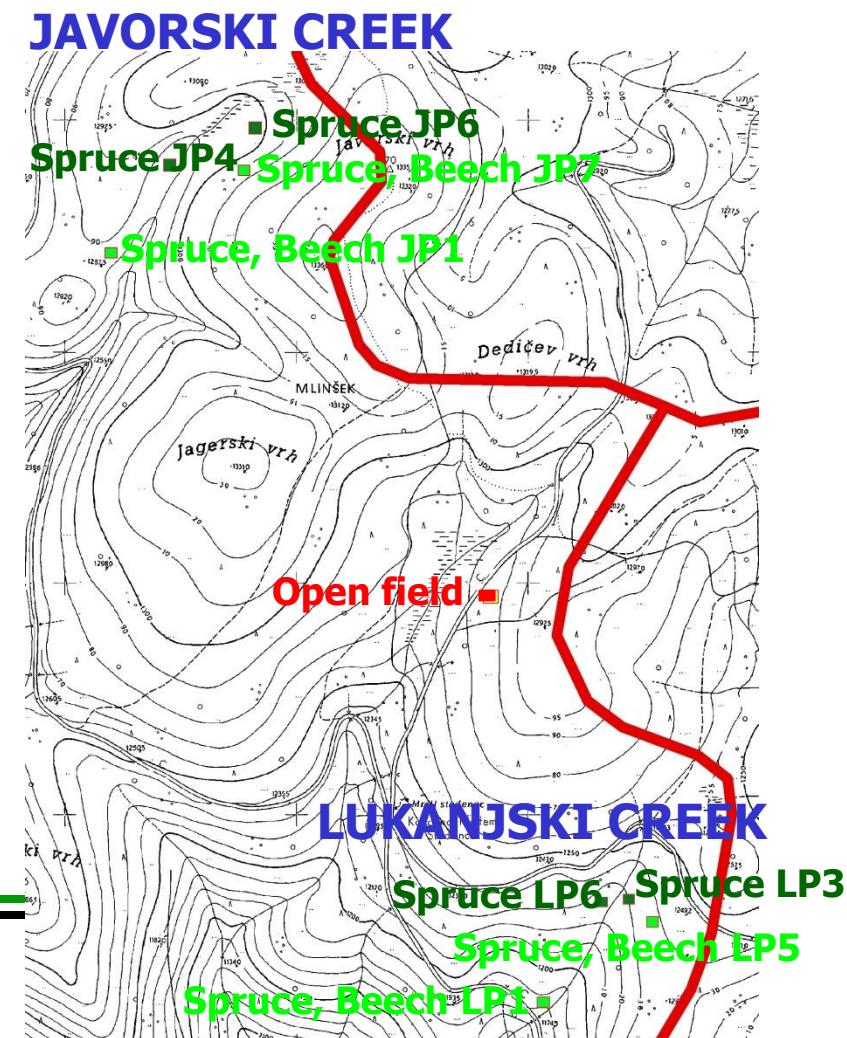




Coniferous and mixed deciduous-coniferous forest stands

MATERIALS AND METHODS

- Measurement period
September 2007 – January 2013
- Open field
Automated weather station
Monthly precipitation in the open field
- Forest stands
Monthly throughfall: 9 collectors per 5 x 5 m plot
Automated raingauges (30 min. interval)

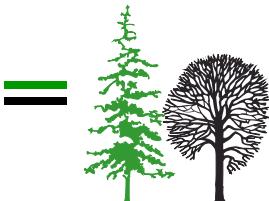
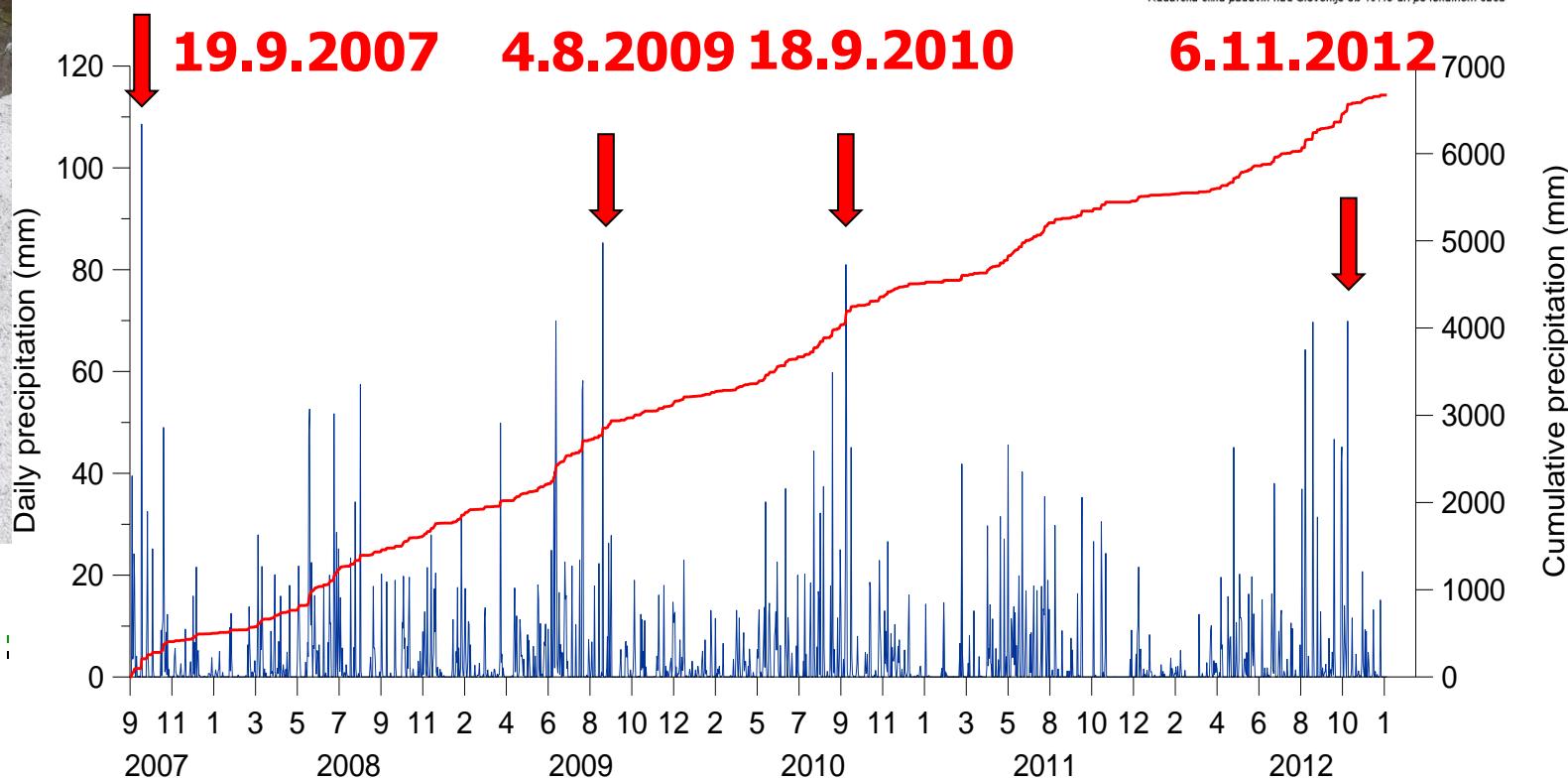
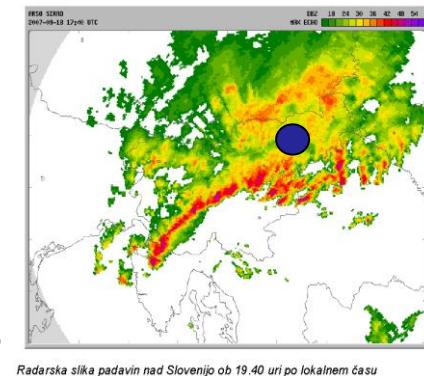




Extreme precipitation events in the Pohorje mountains

RESULTS

- Climatological station Rogla (the Slovene Environmental Agency)
- Extreme precipitation events result in river floods



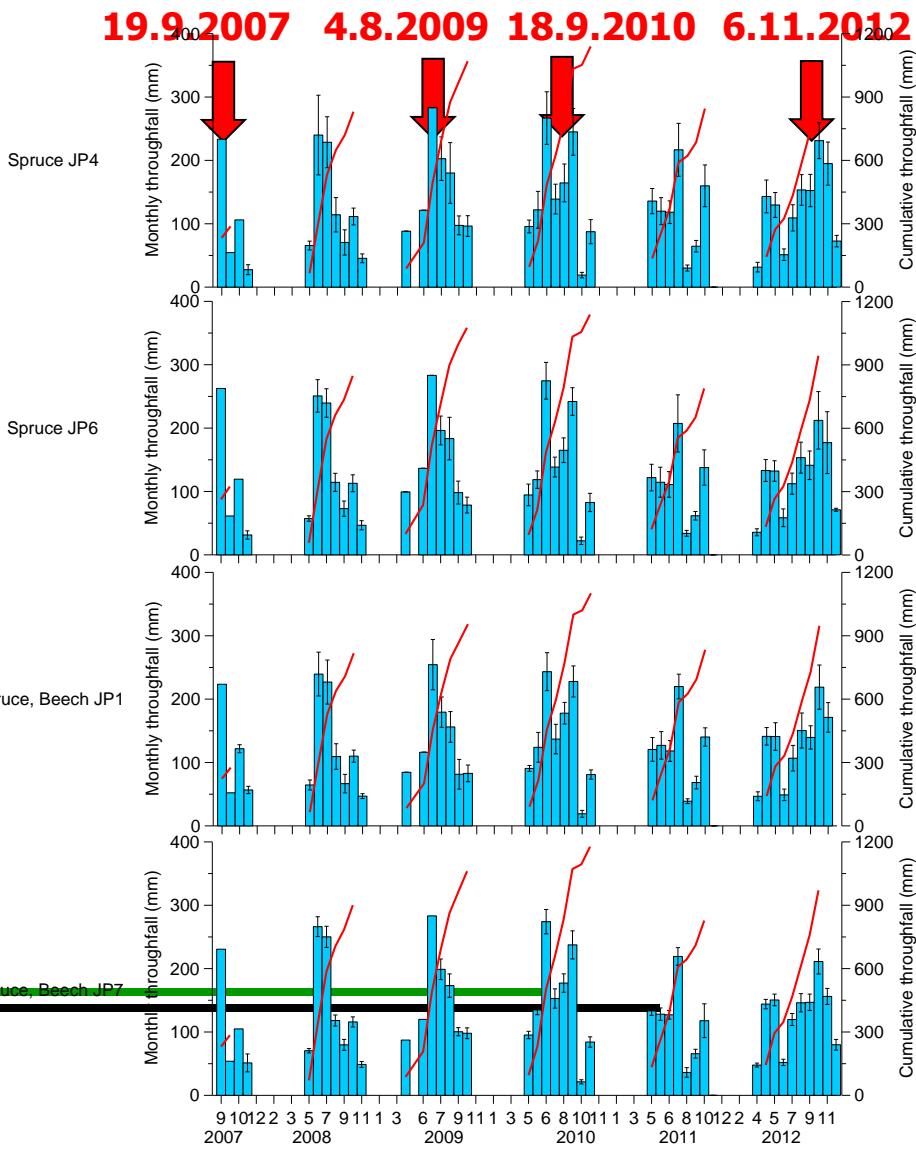


Monthly throughfall measurements

RESULTS

Javorski creek

- Throughfall in spruce stands ranged 95 % - 97 % Open field precipitation
- Throughfall in mixed stands ranged 93 % - 98 % Open field precipitation



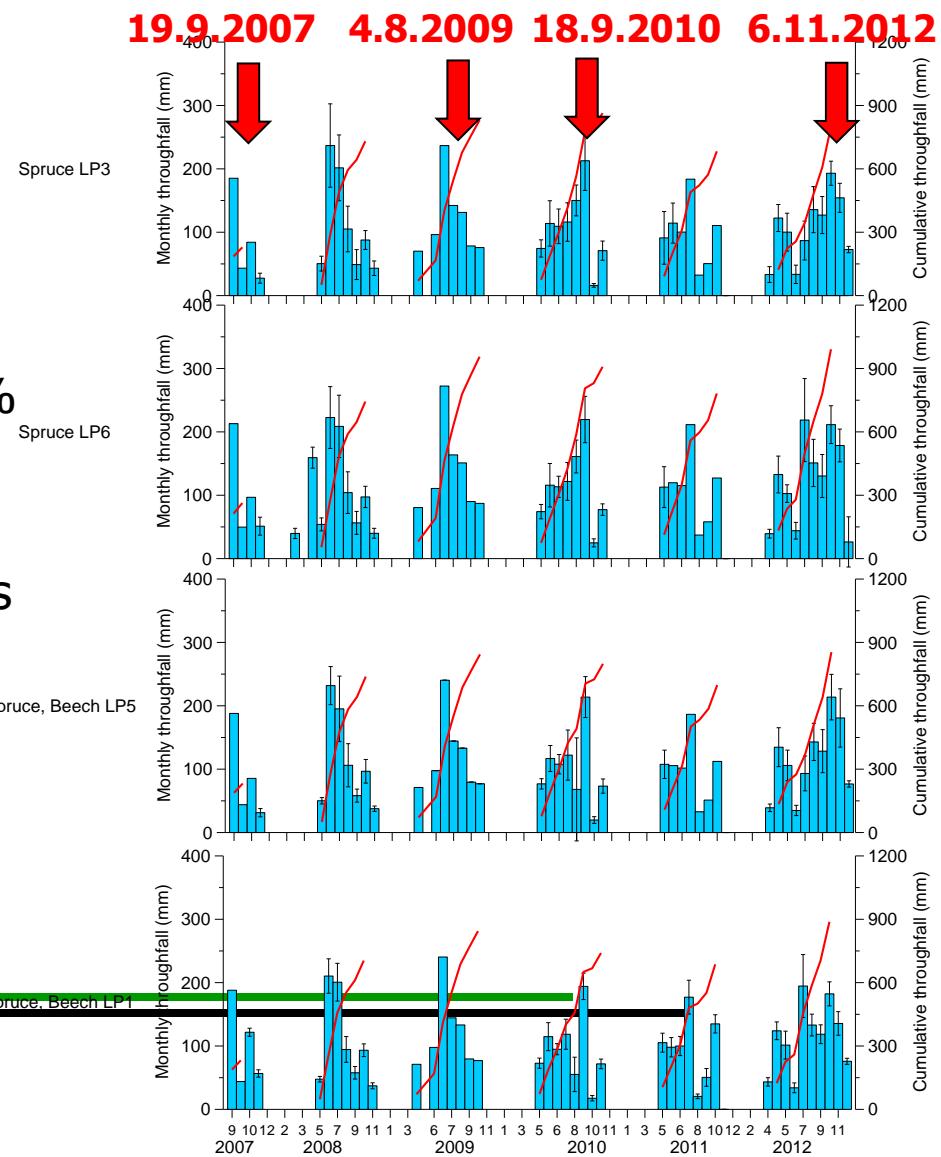


Monthly throughfall measurements

RESULTS

Lukanjski creek

- Throughfall in spruce stands ranged 78 % - 87 % Open field precipitation
- Throughfall in mixed stands ranged 77 % - 78 % Open field precipitation

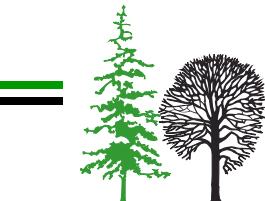
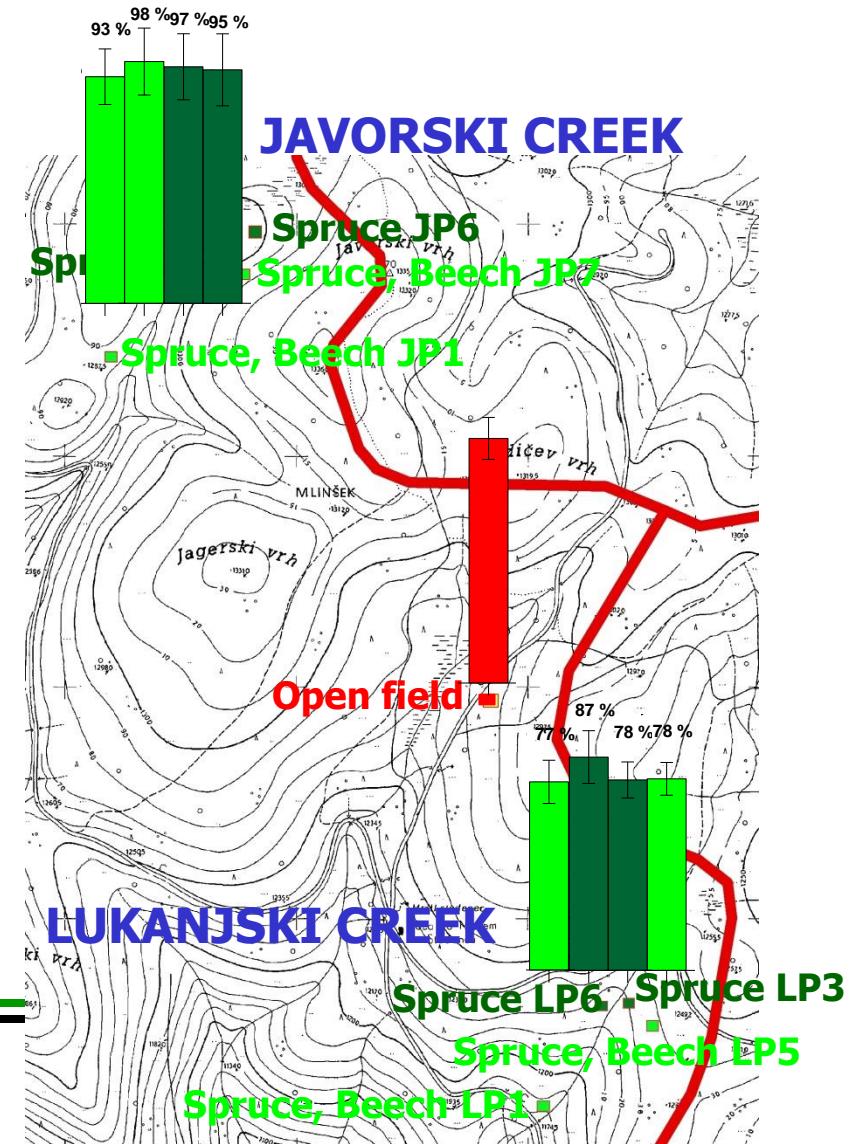




Monthly throughfall measurements

RESULTS

- Higher average growing season throughfall on the plots in Javorski creek compared to the plots in Lukanjski creek
- Small differences between coniferous and mixed deciduous-coniferous forest stands



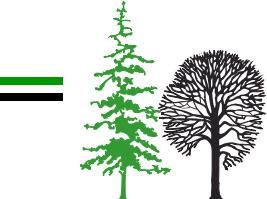
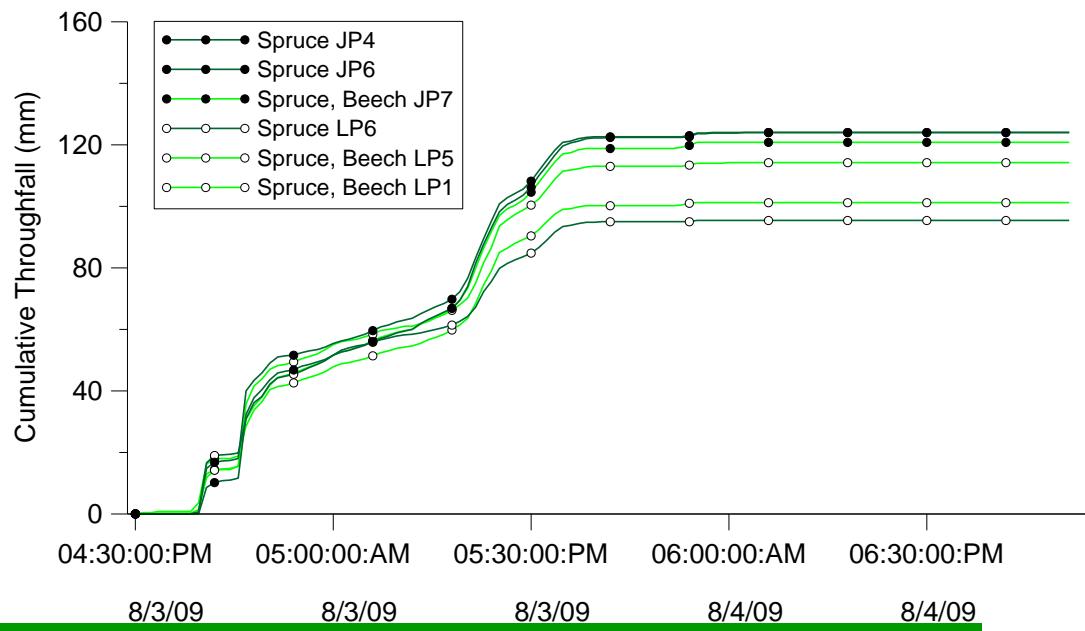


Extreme precipitation event

3 - 4.8.2009

RESULTS

- Throughfall from automated rain gauges (30 minutes interval)
- Higher cumulative throughfall on the plots in Javorski creek compared to the plots in Lukanjski creek



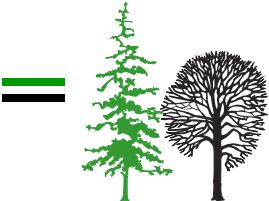
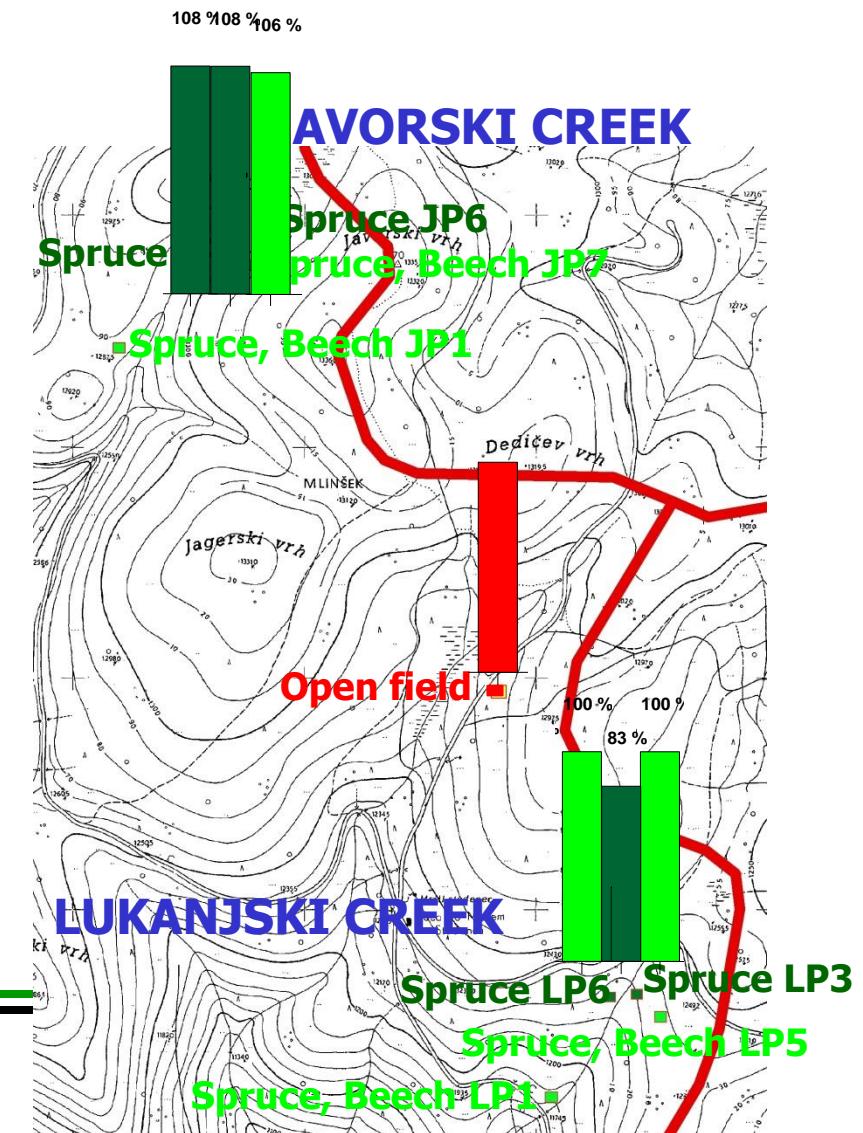


Extreme precipitation event

3 - 4.8.2009

RESULTS

- Throughfall from automated rain gauges (30 min. interval)
- Higher cumulative throughfall on the plots in Javorski creek compared to the plots in Lukanjski creek





Conclusions

- In the measurement period of 5 years extreme precipitation events result in river floods 4 times:
 - 19.9.2007
 - 3. - 4.8.2009
 - 18.9.2010
 - 4 - 5.11.2012





Conclusions

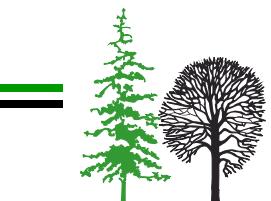
- Monthly throughfall was higher on the plots in Javorski creek compared to the plots in Lukajnski creek.
- Small differences in monthly throughfall between coniferous and mixed deciduous-coniferous forest stands.





Conclusions

- During extreme precipitation event 3. - 4.8.2009 cumulative throughfall was higher on the plots in Javorski creek compared to the plots in Lukanjski creek.
- Differences in cumulative throughfall during extreme precipitation event 3. - 4.8.2009 were more related to differences in precipitation intensity due to topography than to different forest types.
- The conversion of forest from spruce monocultures into mixed deciduous-coniferous forests had a minor impact on throughfall in growing season.





Acknowledgments

The study was part of the Postdoc applied research project, Target Research Project in the Target Research Program "Competitiveness of Slovenia 2006-2013", Program group Forest biology, ecology and technology, financed by Ministry of Education, Science and Sport, and Public forestry service, financed by Ministry of Agriculture and the Environment, Republic of Slovenia.



Thank You!

