Throughfall in different forest types during extreme precipitation event in November 2012

Urša Vilhar, Iztok Sinjur, Primož Simončič
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OUTLINE

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

1. Comparison of throughfall in coniferous and mixed deciduous-coniferous forest stands
2. Extreme precipitation event in the Pohorje mountains: November 2012
3. Conclusions
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
- Natura2000 areas
- Rogla UNITUR Sky resort
Coniferous and mixed deciduous-coniferous forest stands

MATERIALS AND METHODS

− The upper catchment of Oplotnica river
− Dominant tree species:
  • Spruce - *Picea abies* (L. Karst)
  • Beech - *Fagus sylvatica* (L.)
− Research plots:
  • 1 Open field
  • 4 Spruce stand
  • 4 Mixed spruce-beech stand
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

- 8 Forest stands
  • Monthly throughfall: 9 collectors per 5 x 5 m plot
  • Automated raingauges (30’ interval)
Growing season throughfall

RESULTS

Average growing season throughfall on the plots in Javorski creek:
93-98% precipitation in the open

Average growing season throughfall on the plots in Lukanjski creek:
77-87% precipitation in the open
Growing season throughfall

RESULTS
Standardized monthly throughfall

\[ TF_S = \frac{TF_i}{TF_{mean}} \]

- Open field: (49)
- Spruce: (42)
- Spruce, Beech: (43)

Standardized Precipitation and Throughfall (mm / mm)
Extreme precipitation event in November 2012 in the Pohorje mountains

Headwaters of River Oplotnica

River Oplotnica, November 2012

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

https://sites.google.com/site/janjapetricbuu/o-meni

http://www.dnevnik.si/kronika/
Extreme precipitation events in the Pohorje mountains

RESULTS

- Climatological station Rogla (the Slovenian Environment Agency)
- Extreme precipitation events result in river floods

![Graph showing daily and cumulative precipitation with significant events on specific dates: 19.9.2007, 4.8.2009, 18.9.2010, 6.11.2012.](image)
Extreme precipitation event in November 2012

RESULTS

- Precipitation amount during the period from 27th of October till 7th November 2012
- Several climatological stations (the Slovenian Environment Agency)

The maximum radar reflectivity of precipitation 27 October at 3.40 CEST the time (ARSO Archive)
Extreme precipitation event in November 2012

RESULTS

- Throughfall from automated rain gauges (30’)
- Higher cumulative throughfall in spruce stands compared to mixed spruce-beech stands
Extreme precipitation event in November 2012

RESULTS

- Throughfall from automated rain gauges (30' interval)

- Higher cumulative throughfall in spruce stands compared to mixed spruce-beech stands
Conclusions

– Monthly throughfall was higher on the plots in Javorski creek compared to the plots in Lukanjski creek.

– Standardized monthly throughfall
  → Small differences in seasonal throughfall between coniferous and mixed deciduous-coniferous forest stands.
Conclusions

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

- During extreme precipitation event in November 2012 cumulative throughfall was higher in spruce stands compared to mixed spruce-beech stands.

- The conversion of forest from spruce monocultures into mixed deciduous-coniferous forests had a minor impact on throughfall during growing season.
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Thank You!