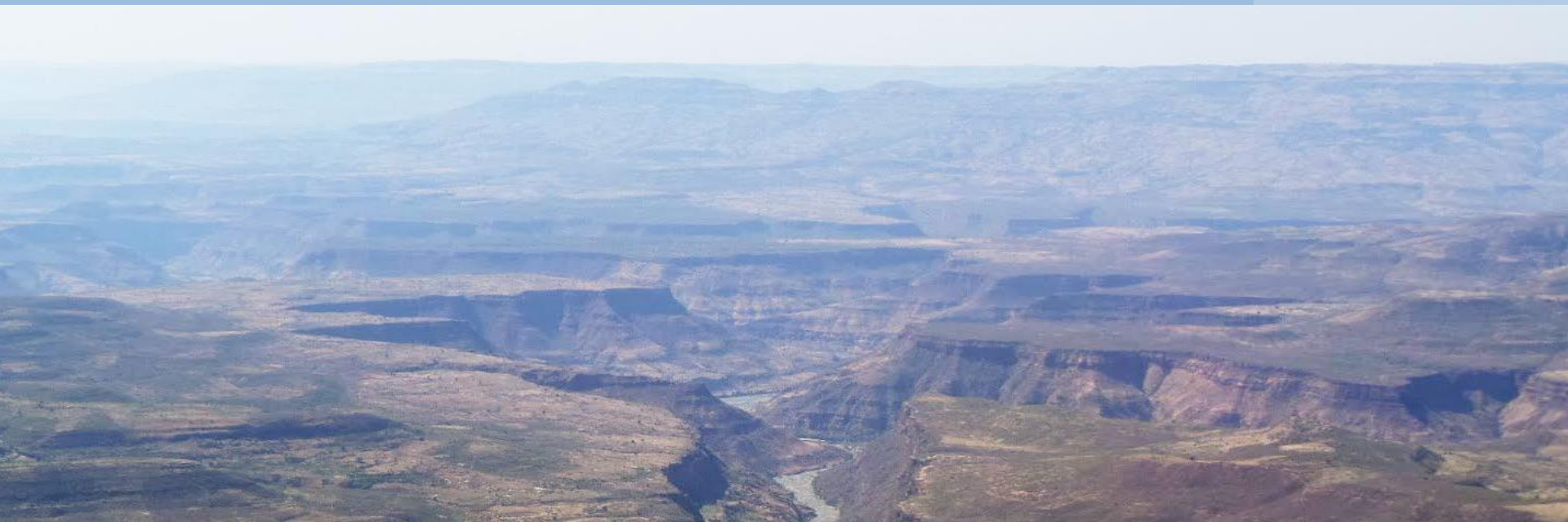


Assessment of SWAT uncertainty when using variable spatial data resolution in a meso-scale watershed in the upper BNB, Ethiopia



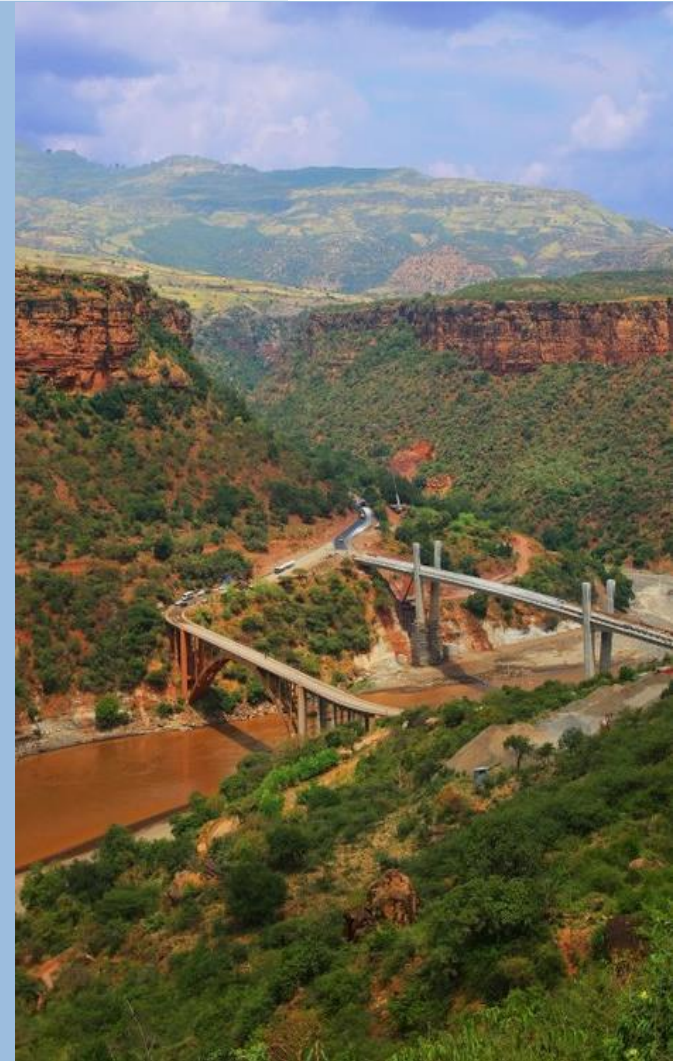
Centre for Development and Environment (CDE), University of Bern, Switzerland
Vincent Roth & Tatenda Lemann

- > Introduction
- > Field of research
- > Data
- > Application of SWAT in research context
- > Results
- > Conclusions
- > Questions

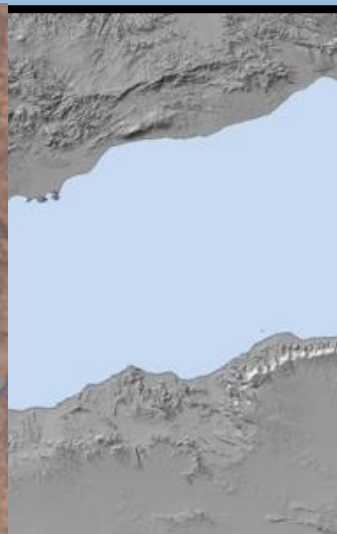


- > PhD
- > Centre for Development and Environment (CDE), University of Bern Switzerland
- > Water and Land Resource Centre (WLRC), Ethiopia (former SCRIP)

- > Supervisor: Prof. Dr. Dr. Hans Hurni, Dr. Gete Zeleke



Field of research

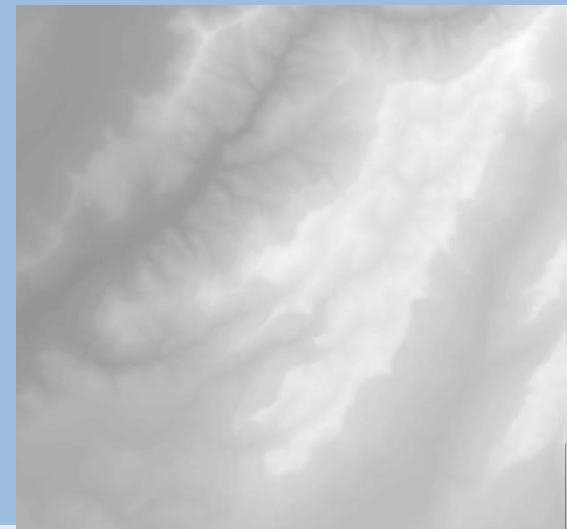
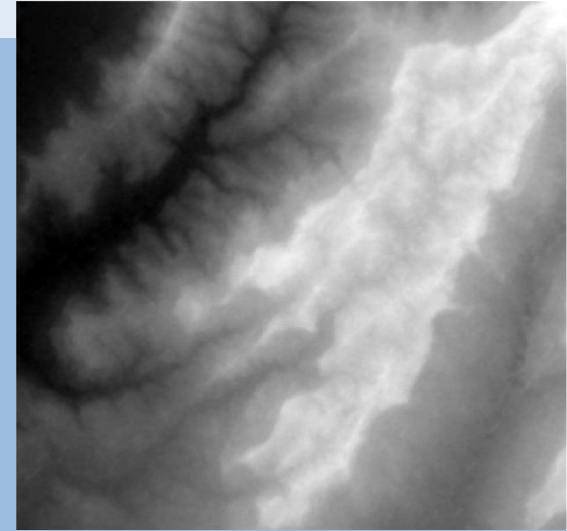




Application of SWAT in research context

- > Low-resolution:
 - AsterDEM (30x30m)
 - Soils FAO (1 cat.)
 - Land use FAO (6 cat.)
 - Rainfall SCRP/WLRC

- > High resolution
 - Alos World DEM (5x5m)
 - Soils WLRC (19)
 - Land use (12)
 - Rainfall SCRP/WLRC

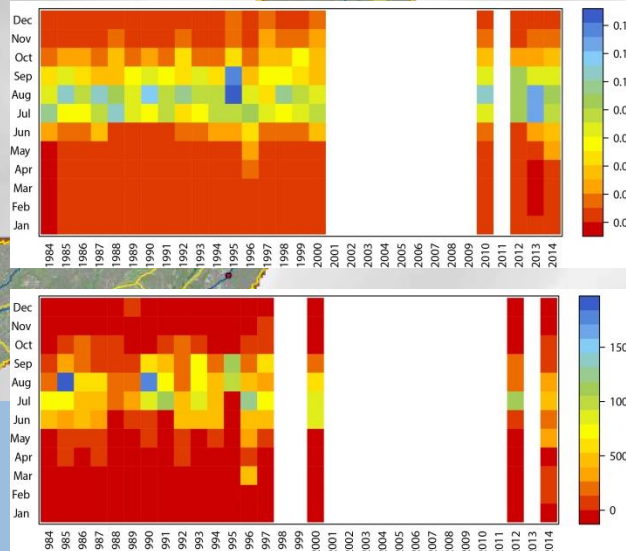


- > SWAT preparation
 - Land use (own observation)
 - Management with heat units
 - Implementation of “Maresha”
 - Implementation of Teff



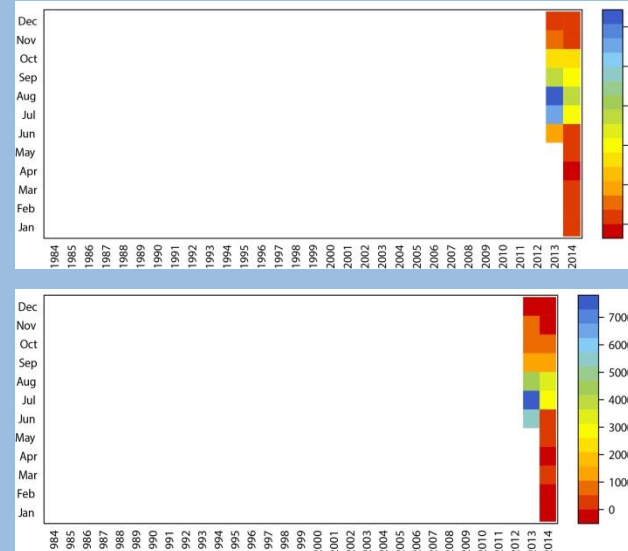
Time

- > Calibration
 - 1982 – 2000
 - 2 year warm-up period
- > Validation
 - 2010 – 2010

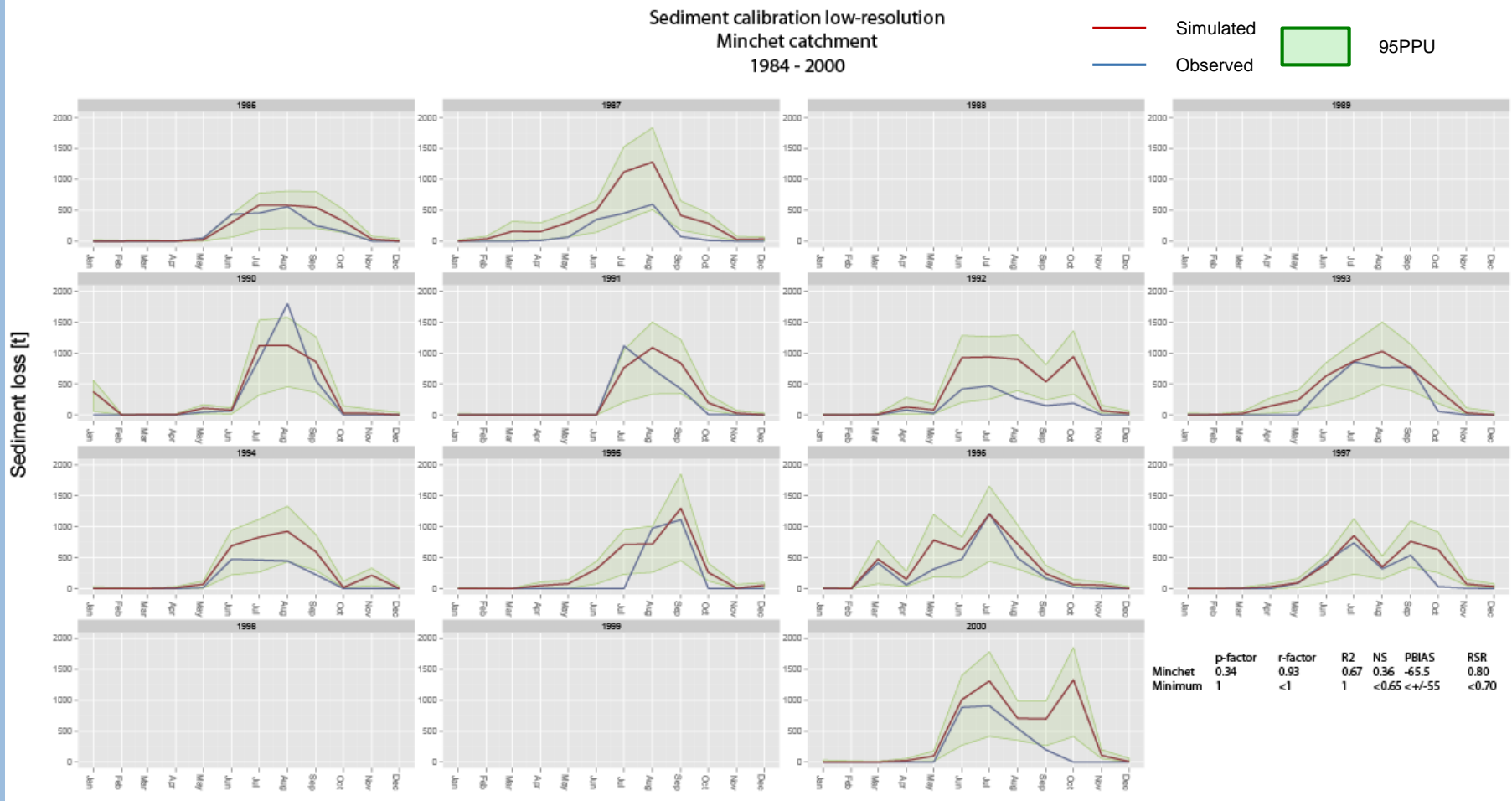


Space

- > Calibration
 - Minchet only
- > Validation
 - Minchet

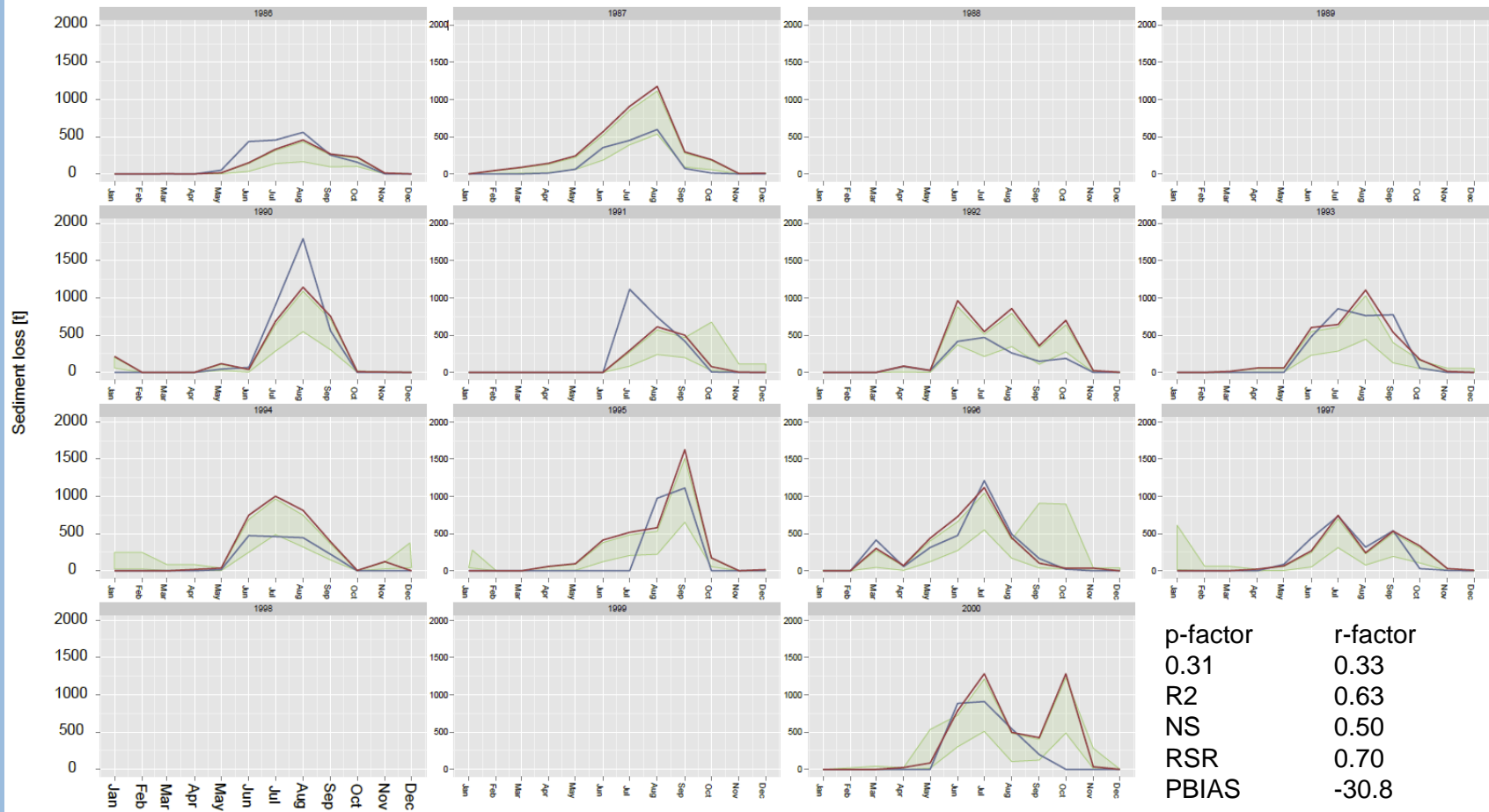


Calibration results low-resolution Minchet catchment



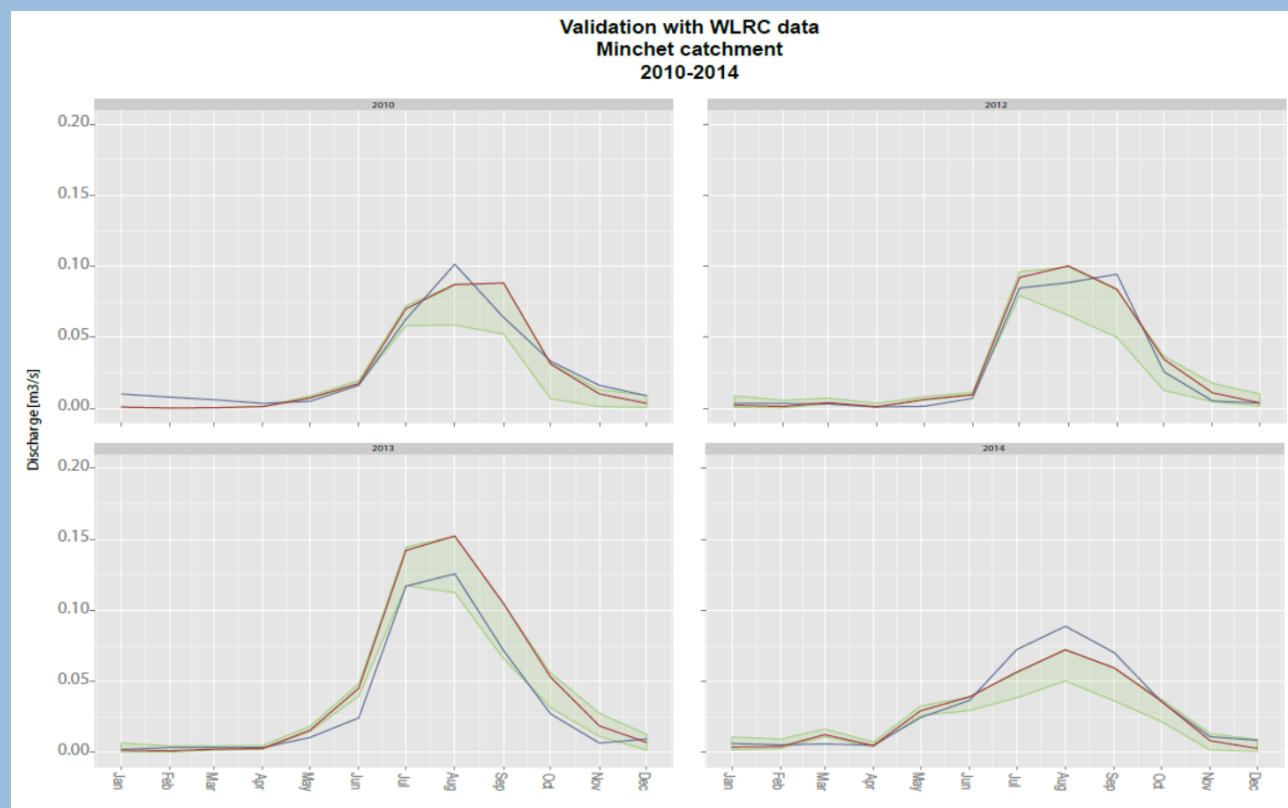
Calibration results high-resolution Minchet catchment

**Sediment calibration with WLRC data
Minchet catchment
1986-2000**



Validation results Minchet Discharge

> High-res



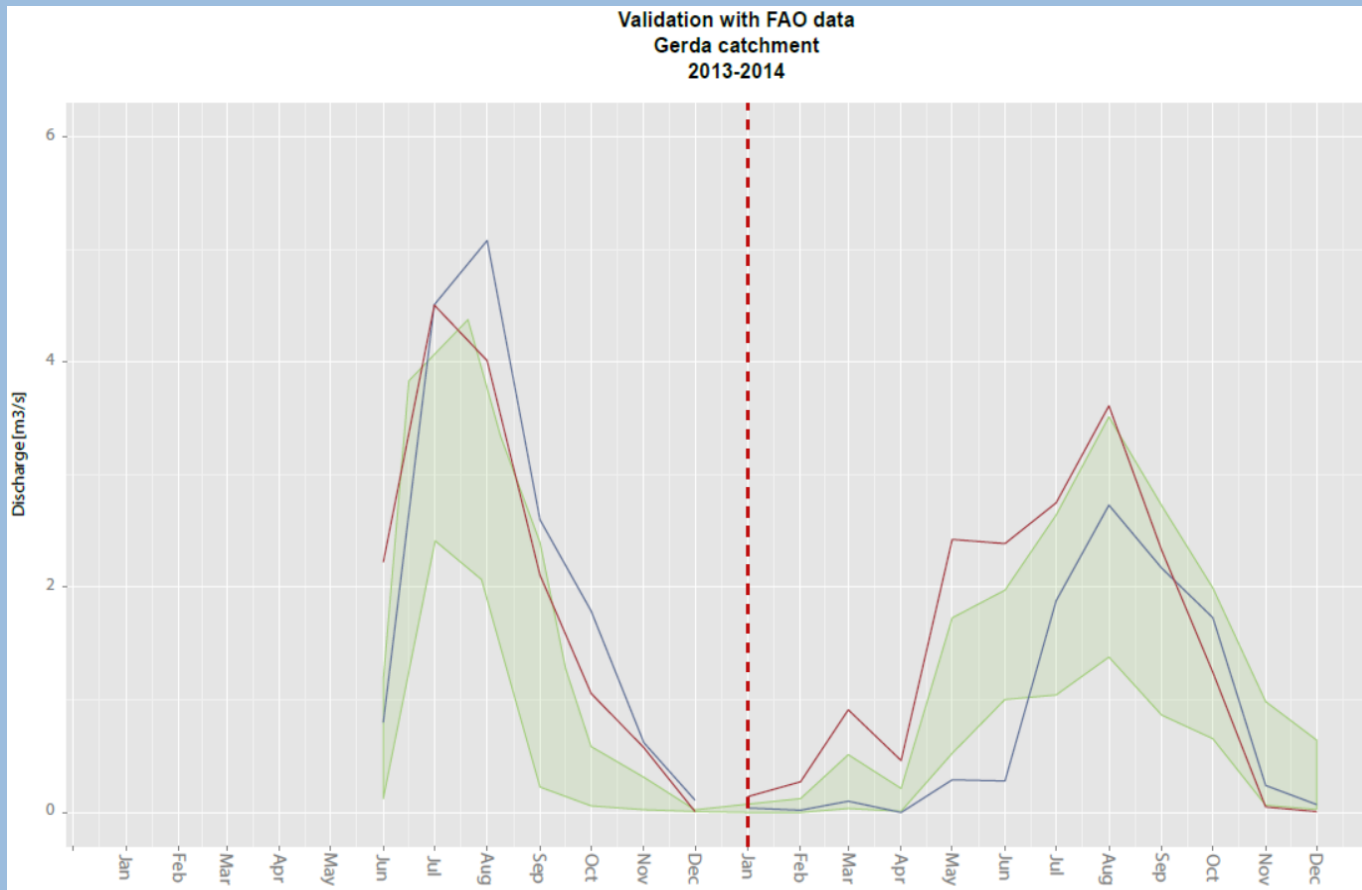
P-factor	r-factor
0.75	0.65
R2:	0.79
NS:	0.74
RSR:	0.51
PBIAS:	-12.4
P-factor	r-factor
0.60	0.24
R2:	0.93
NS:	0.90
RSR:	0.32
PBIAS:	-7.8

Validation results Gerda watershed



Validation results Gerda watershed - DISCHARGE

> High-res



P-factor 0.53 r-factor 0.64

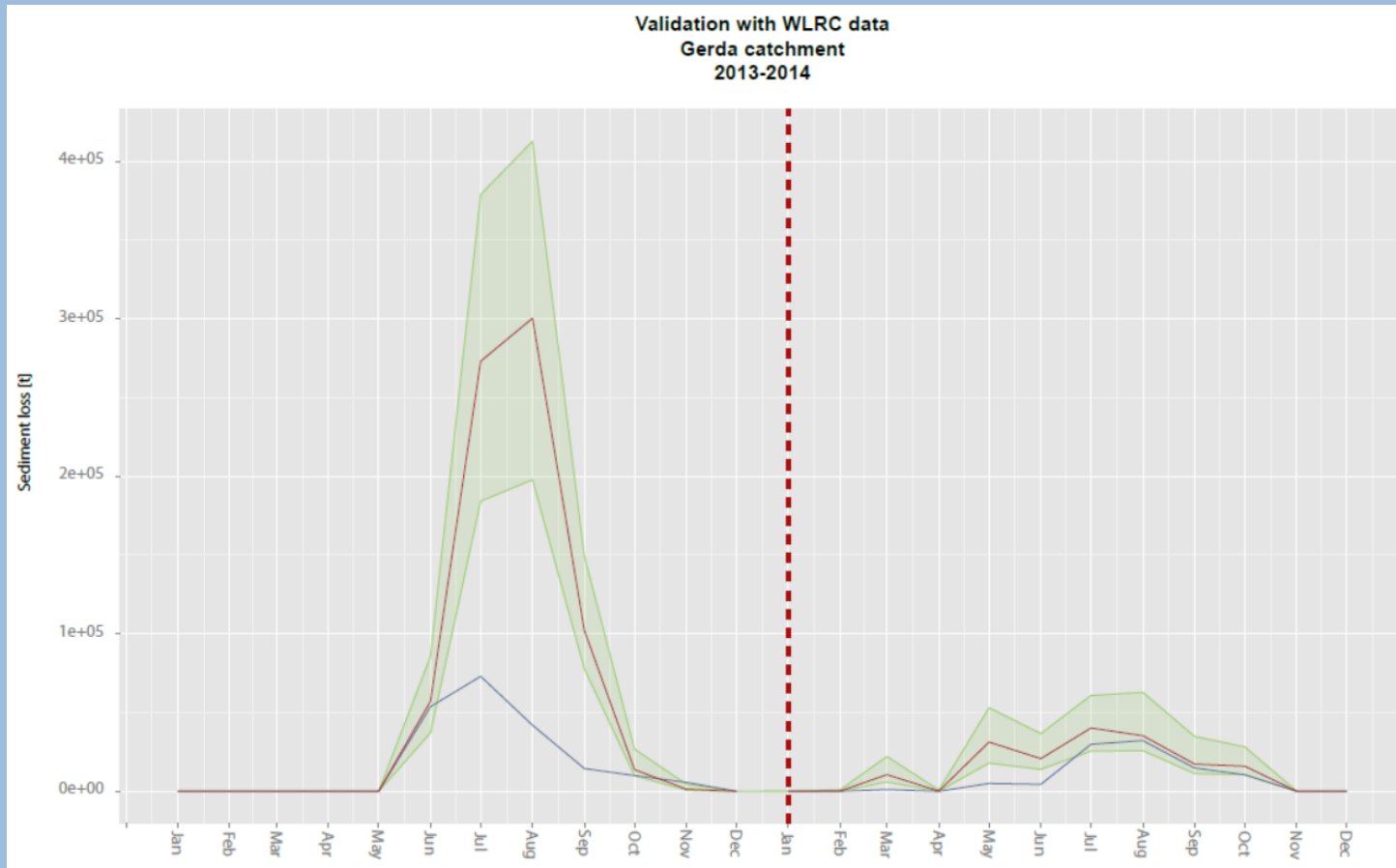
R2: 0.79
NS: 0.74
RSR: 0.60
PBIAS: -12.4

P-factor 0.37 r-factor 0.38

R2: 0.69
NS: 0.63
RSR: 0.060
PBIAS: -24.0

Validation results Gerda watershed - SEDIMENT

> High-res



P-factor 0.42 R-factor 1.30

R2: 0.50
NS: 0.40
RSR: 0.78
PBIAS: -25.1

P-factor 0.32 R-factor 1.40

R2: 0.60
NS: -13.5
RSR: 3.81
PBIAS: -210

- > Conclusions and implications for discharge and sediment loss
 - Discharge is very robust
 - Sediment loss modelling is more sensitive

- > Discharge is “easily” scalable in watershed
- > Discharge can be modelled through upscaling

- > Sediment loss is sensitive to upscaling
- > Sediment loss depends strongly on input data resolution

Thank you



