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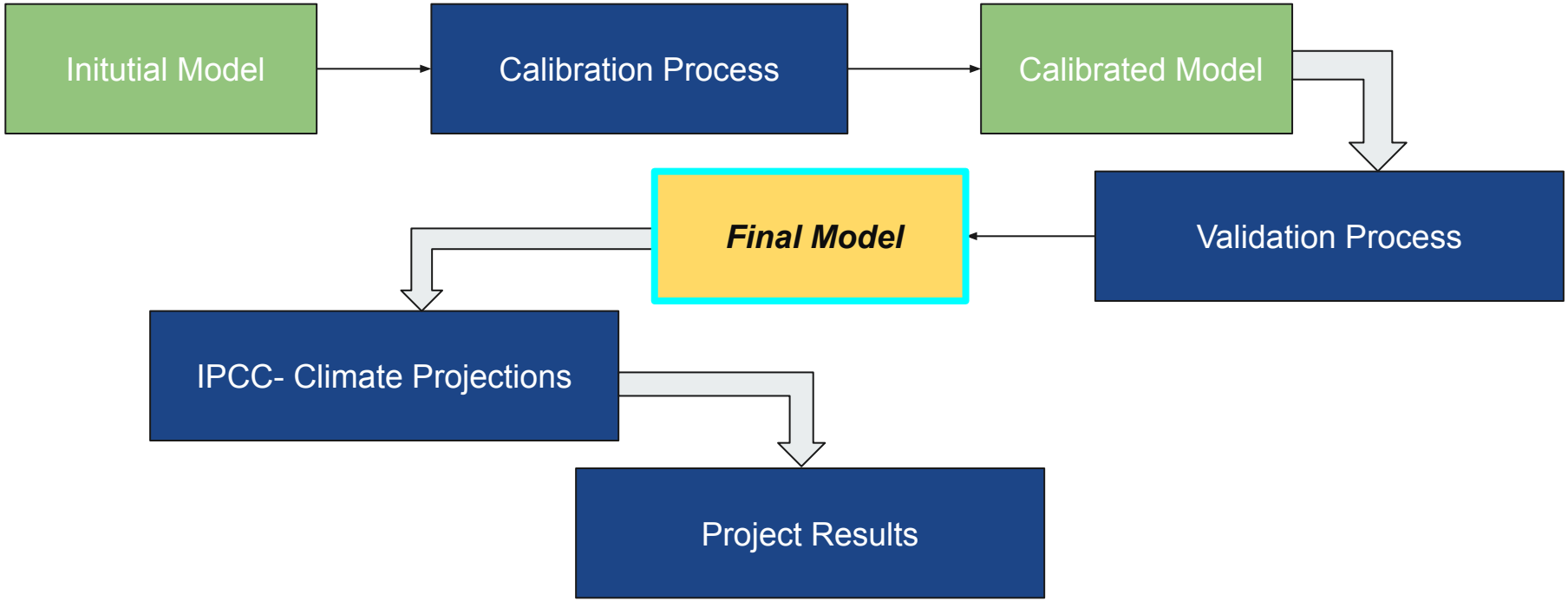
Team 08 Presentation 3

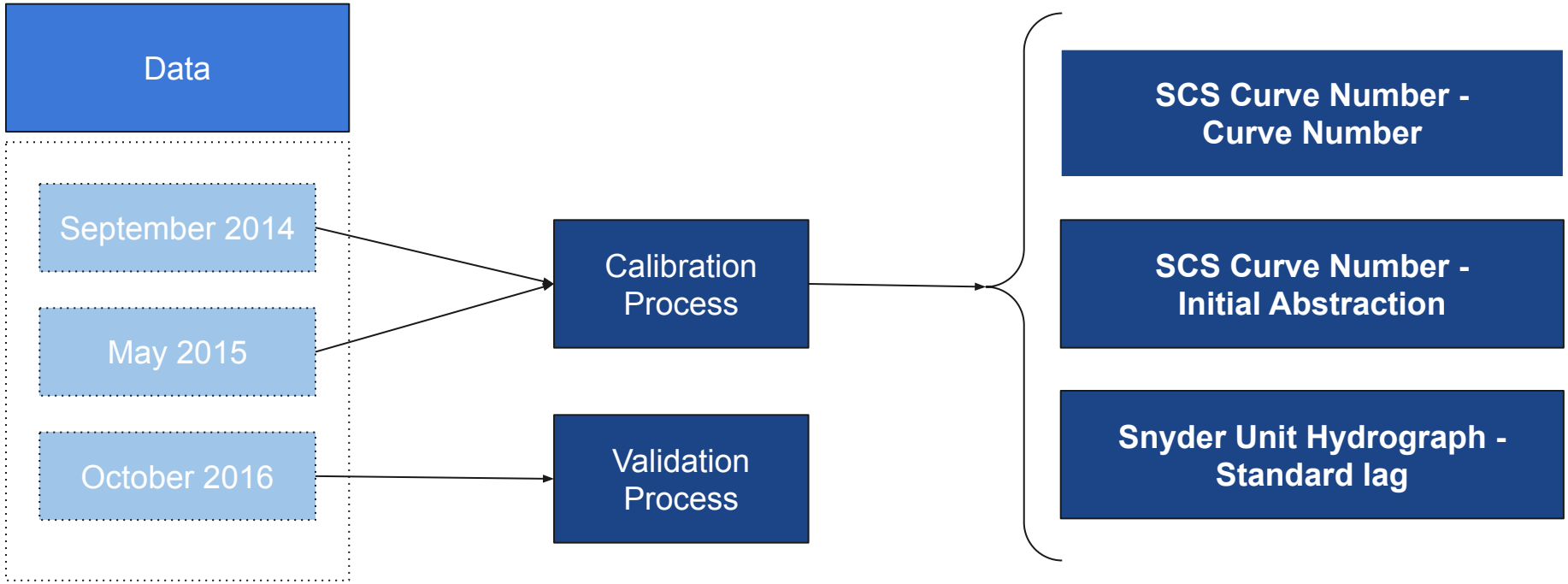
HYDROEUROPE

IPCC Scenario Analysis in the Context of Change in Discharge

March 2024

Overview:


Initutial Model
Calibration Process
Calibrated Model
Validation Process
Final Model
IPCC- Climate Projections
Project Results

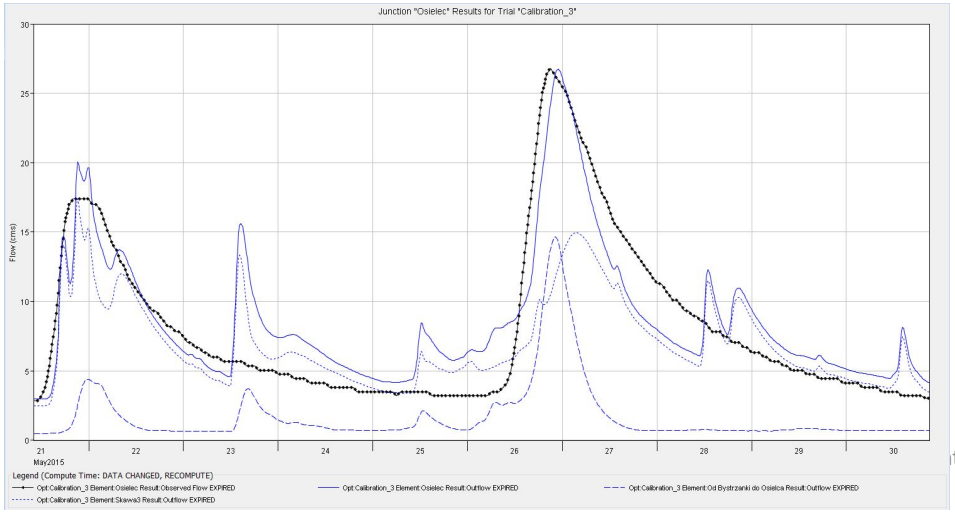

Data
September 2014
May 2015
October 2016
Calibration Process
Validation Process
SCS Curve Number - Curve Number
SCS Curve Number - Initial Abstraction
Snyder Unit Hydrograph - Standard lag

Calibration Process

September 2014

Observed Hydrograph at Gage Wod.Osielec

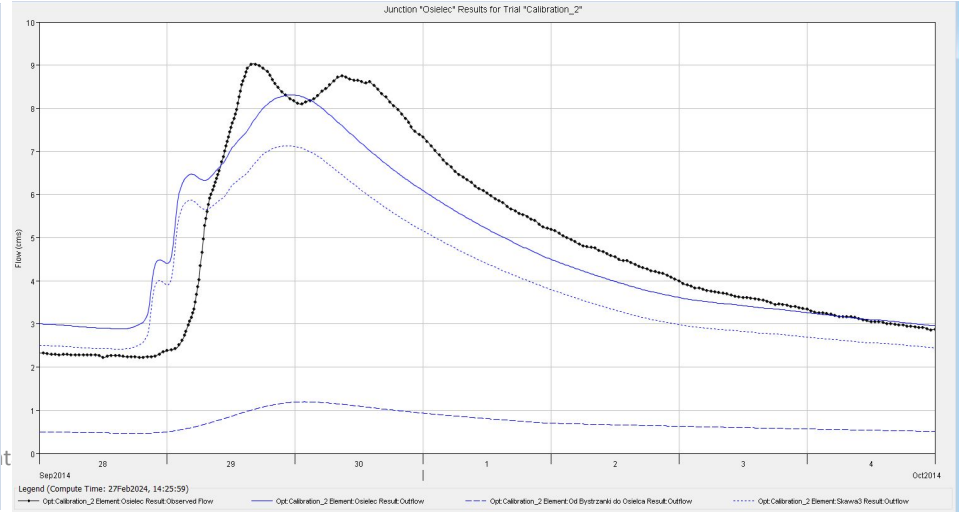
Peak Discharge:	9.0 (M3/S)	Date/Time of Peak Discharge:	29Sep2014, 16:00
Mean Abs Error:	0.7 (M3/S)	RMS Error:	1.0 (M3/S)
Volume:	2975.4 (1000 M3)	Volume Residual:	-106.7 (1000 M3)
Nash-Sutcliffe:	0.812		



May 2015

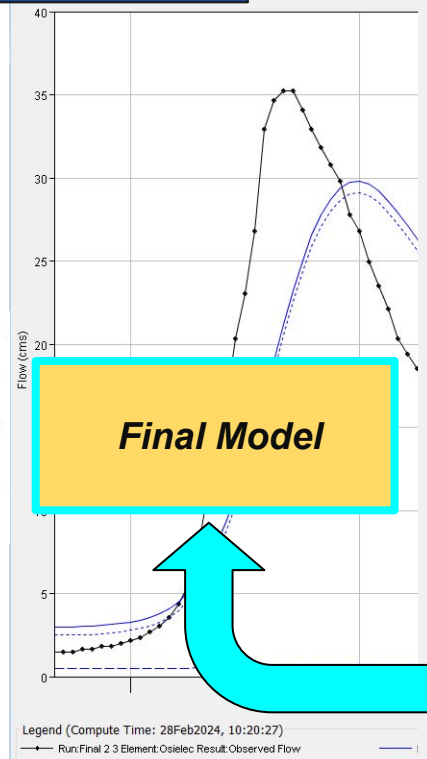
Observed Hydrograph at Gage Wod.Osielec

Peak Discharge:	26.8 (M3/S)	Date/Time of Peak Discharge:	26May2015, 21:00
Mean Abs Error:	2.2 (M3/S)	RMS Error:	2.7 (M3/S)
Volume:	6708.2 (1000 M3)	Volume Residual:	454.9 (1000 M3)
Nash-Sutcliffe:	0.788		



Validation Process

October 2016



Project: Part1 Simulation Run: Final 2 3

Junction: Osielec

Start of Run: 03Oct2016, 16:00
End of Run: 09Oct2016, 16:00
Compute Time: 28Feb2024, 10:20:27

Basin Model: Final 2
Meteorologic Model: Polynomial_precipitation
Control Specifications: 2016_october

Volume Units: ○ MM ◉ 1000 M3

Computed Results

Peak Discharge: 29.8 (M3/S)
Volume: 8709.2 (1000 M3)

Date/Time of Peak Discharge: 05Oct2016, 00:00

Observed Hydrograph at Gage Wod.Osielec

Peak Discharge: 35.2 (M3/S)
Mean Abs Error: 3.2 (M3/S)

Date/Time of Peak Discharge: 04Oct2016, 16:00
RMS Error: 4.6 (M3/S)
Volume Residual: 375.4 (1000 M3)

Nash-Sutcliffe: 0.755

Final Model

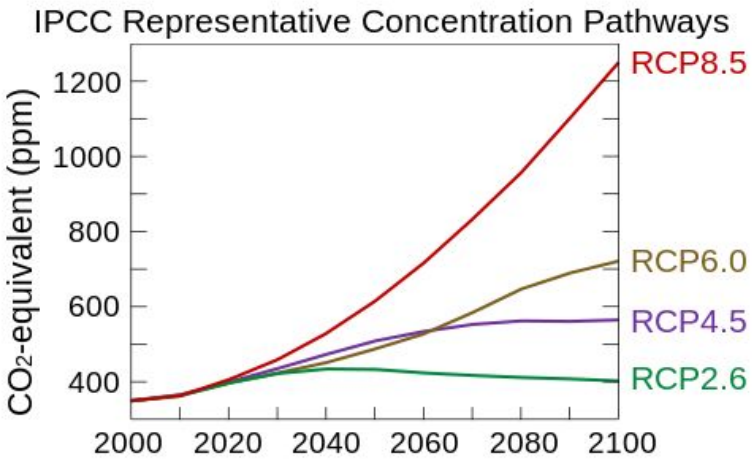
IPCC - Climate Projections

What are the main differences between RCP 4.5 and RCP 8.5 ?

Representative Concentration Pathway :

- **greenhouse gas concentration trajectory adopted by the IPCC**
- **named based on potential radiative forcing values expected by the year 2100**
- **2.6, 4.5, 6, and 8.5 W/m²**

RCP 4.5 and RCP 8.5 represent scenarios of moderate climate policy and inaction, making them valuable for assessing a range of potential climate impacts



IPCC - Climate Projections

Long term vs Near term projections

- **Long Term**
  - **Extends decades to centuries**
  - **Wide confidence intervals**
  - **Crucial for understanding long-term impacts**
- **Near Term**
  - **Covers months to decades**
  - **Narrow confidence intervals**
  - **Important for immediate planning**

IPCC - Climate Projections

Based on the table below , we modify the precipitation data for the three events that will be used for Projections

Month	RCP 4.5		RCP 8.5	
	NT-2	LT	NT-2	LT
April	5	10	10	20
May	5	10	10	20
June	-10	-15	-10	-20
July	-10	-15	-10	-20
August	-10	-15	-10	-20
September	5	10	10	25
October	15	20	10	35

Validation with future events

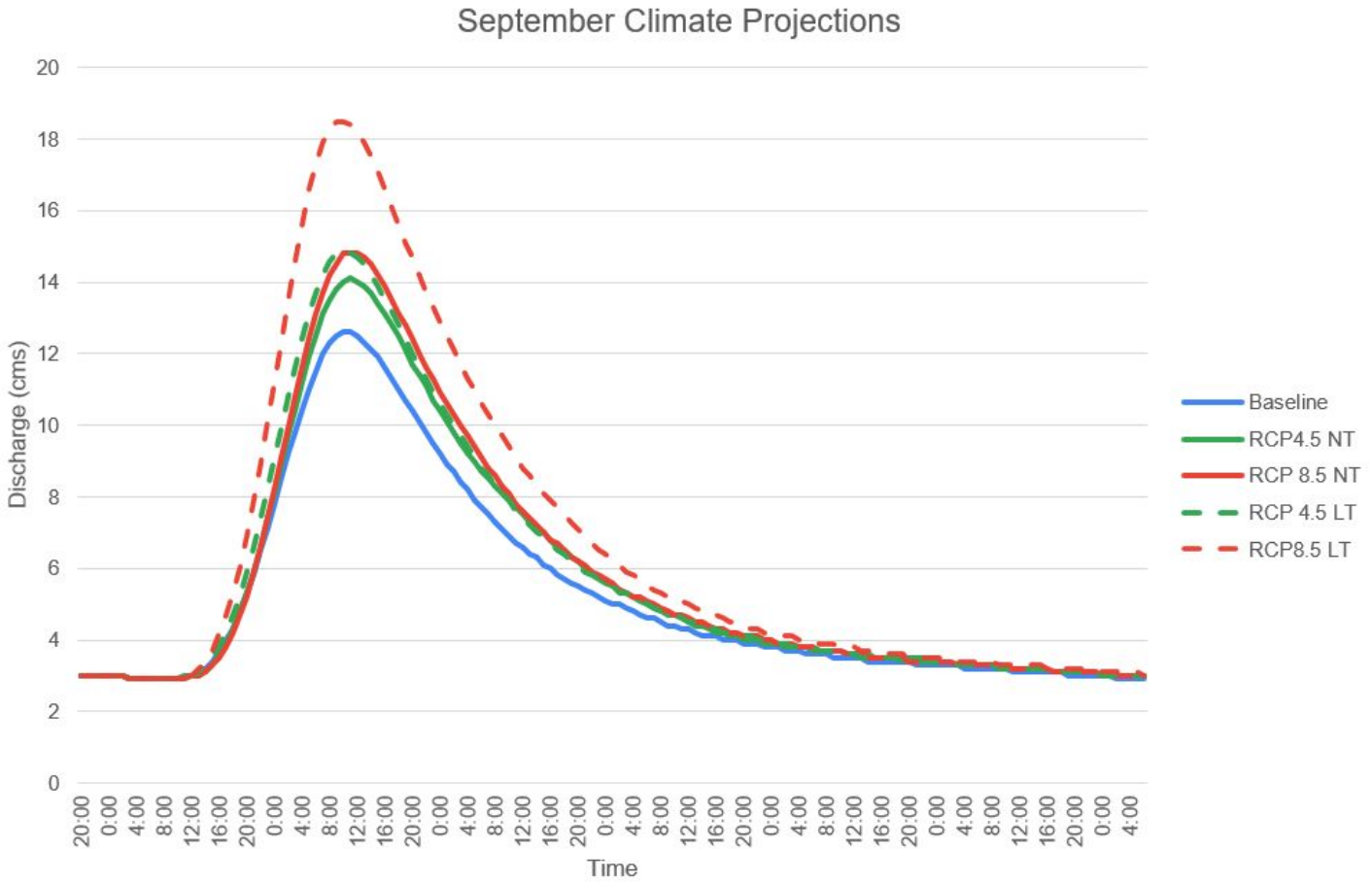
3 events considered :

- **30 september 2014.**
- **21 may 2015.**
- **3 october 2016.**

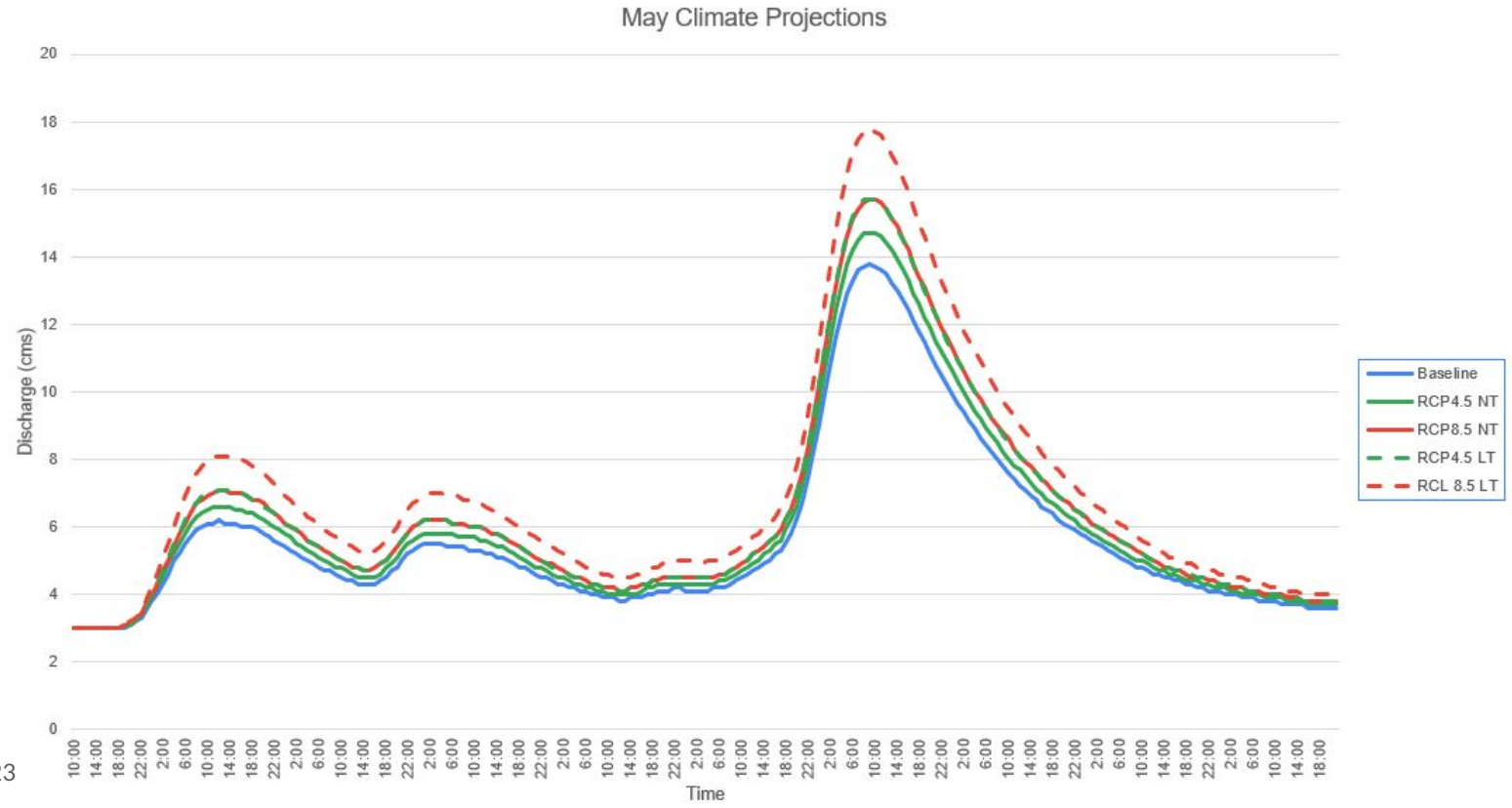
No Nash-Sutciffe Criteria but comparison with Baseline

Month	RCP 4.5		RCP 8.5	
	NT-2	LT	NT-2	LT
April	5	10	10	20
May	5	10	10	20
June	-10	-15	-10	-20
July	-10	-15	-10	-20
August	-10	-15	-10	-20
September	5	10	10	25
October	15	20	10	35

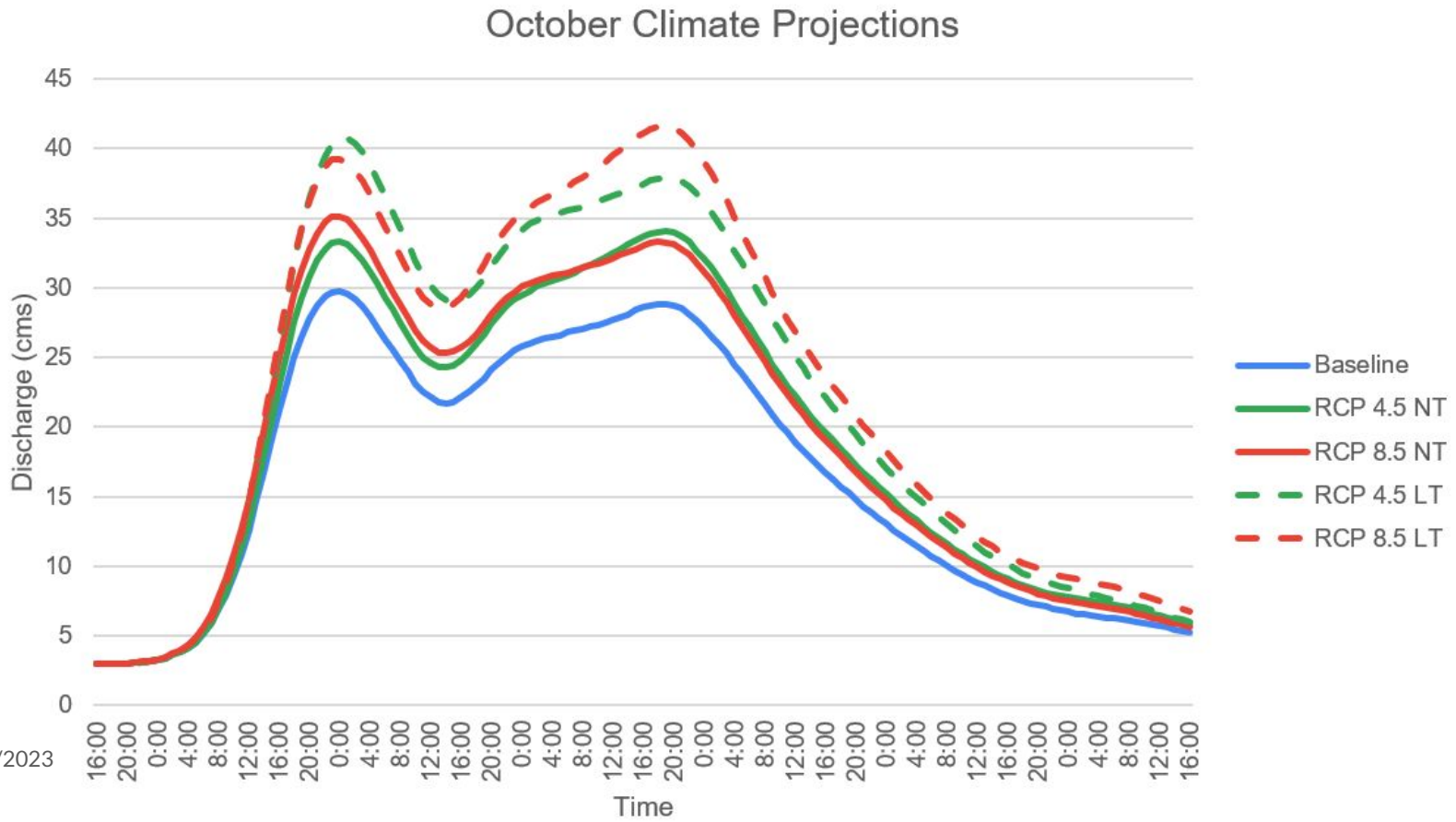
September 2014



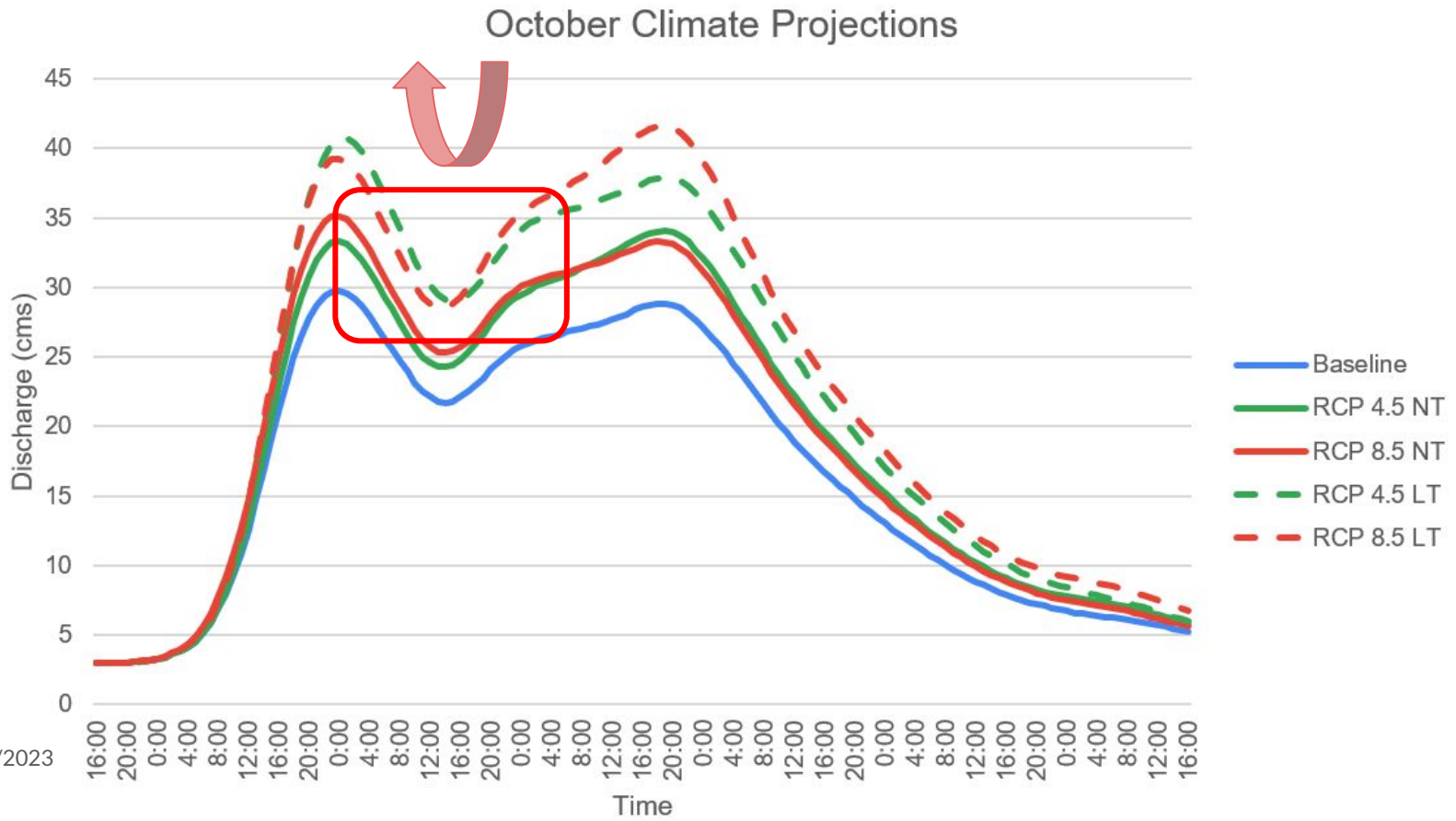
May 2015


May Climate Projections
Discharge (cms)
Time
Baseline
RCP4.5 NT
RCP8.5 NT
RCP4.5 LT
RCL 8.5 LT

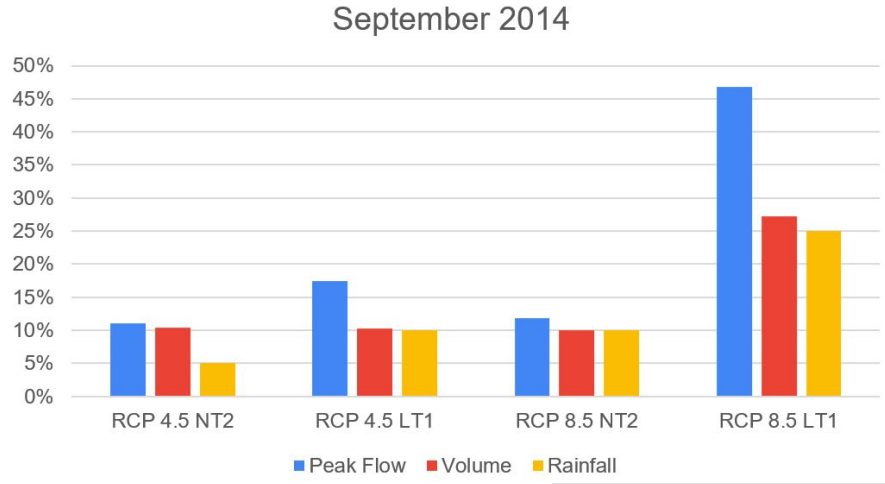
October 2016

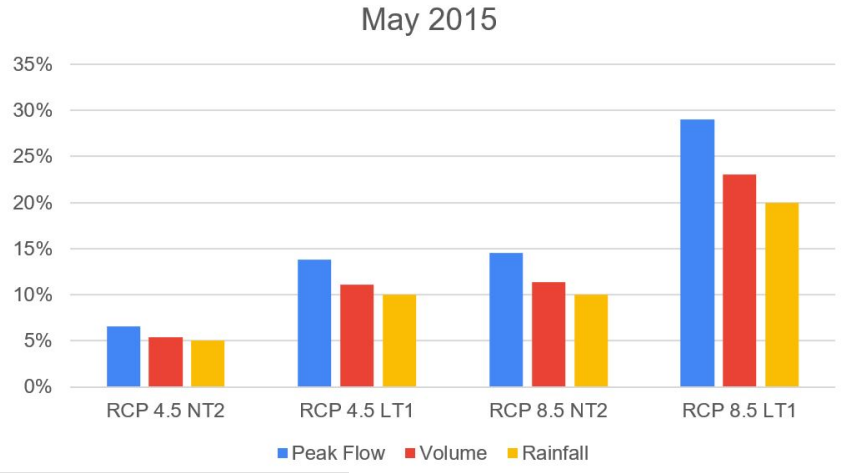


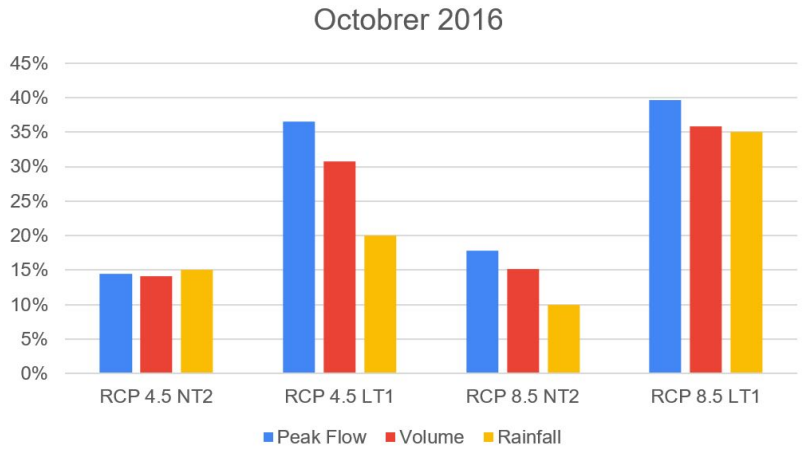
October 2016



Analysis of statistical indicators







What are the consequences ?

Higher precipitation, changes in precipitation patterns, or more intense storms …
May overwhelm existing drainage systems and more frequent and **severe floods**.

Increased flow can enhance **soil erosion** and sediment transport within catchments.

Species adapted to specific flow regimes may be at risk, and changes in sediment transport can impact the **habitats of aquatic organisms**.

Thank you for listening!

Questions ?