# Analysis of natural river channel representation impact in numerical model river flow.

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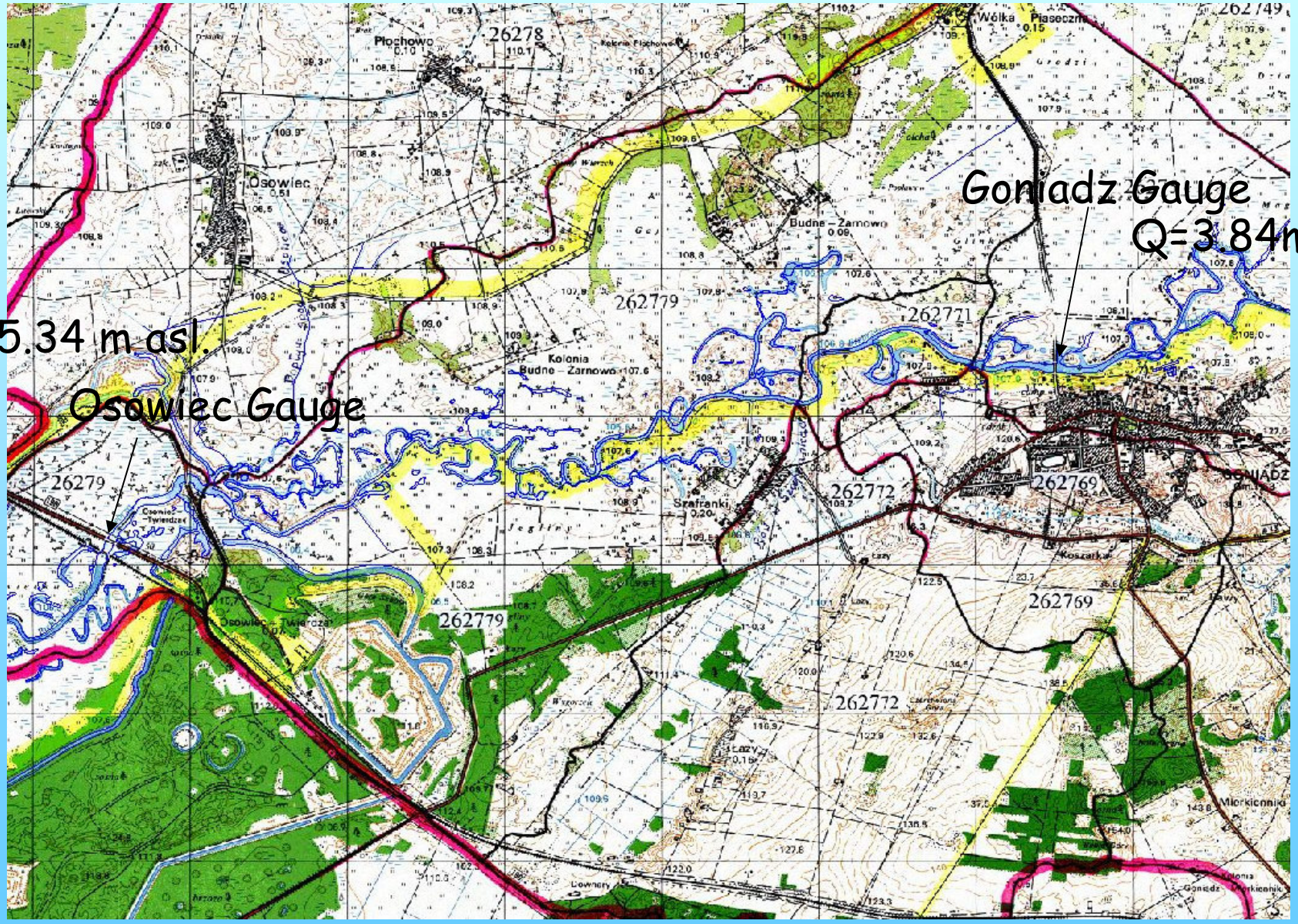
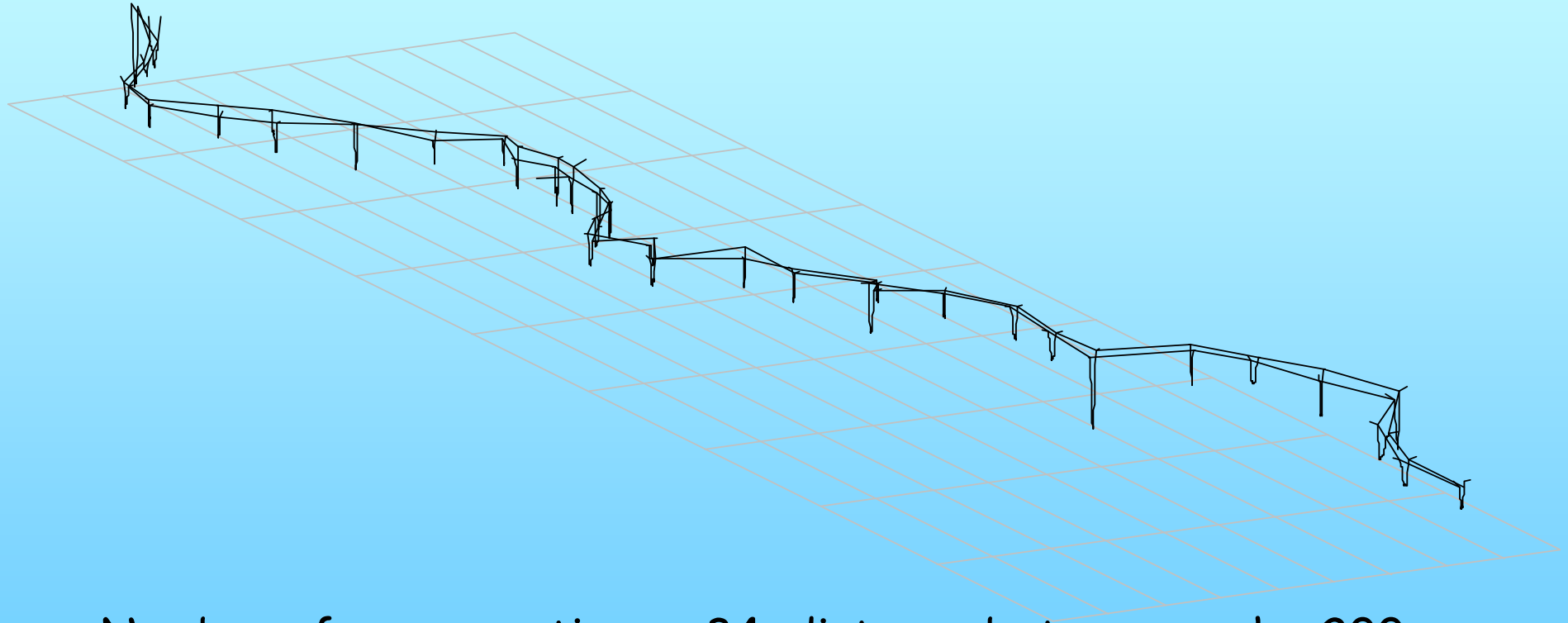
# Modeled river reach Goniadz-Osowiec (7.56km) (steady state)

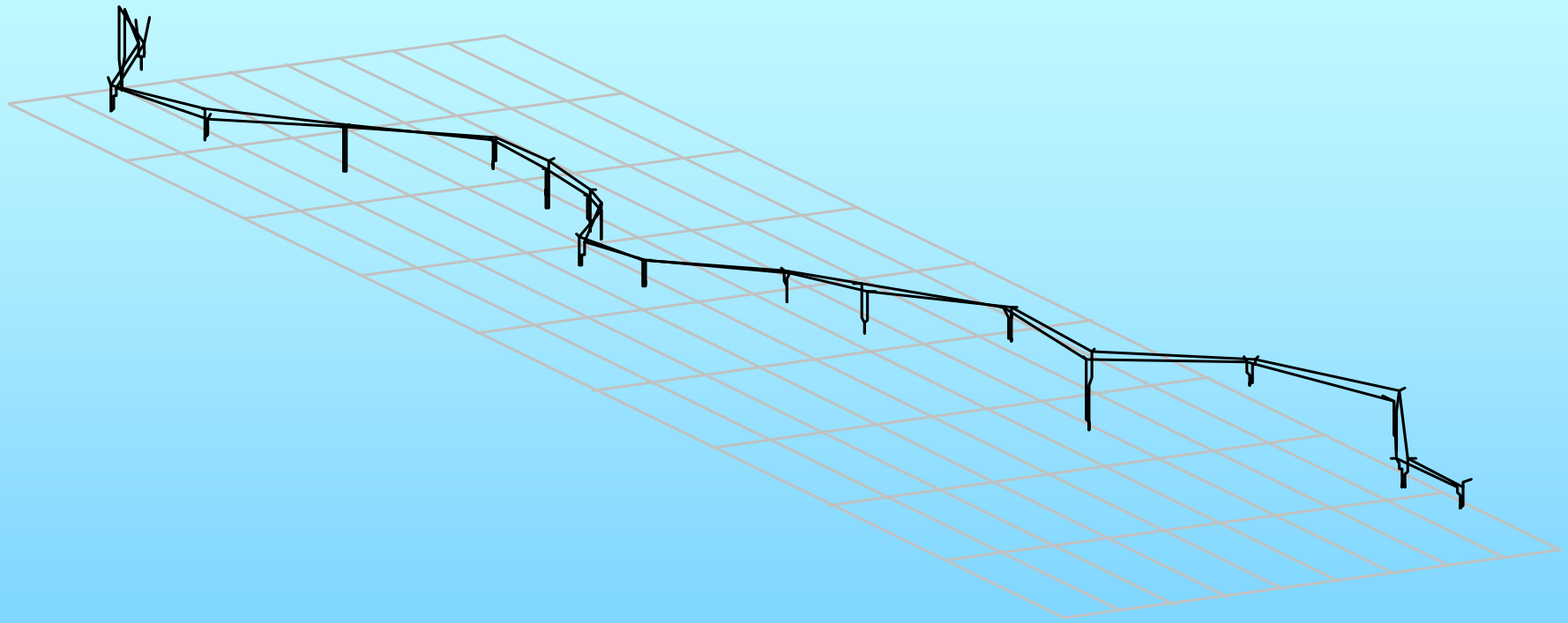


# Analyzed cross sections



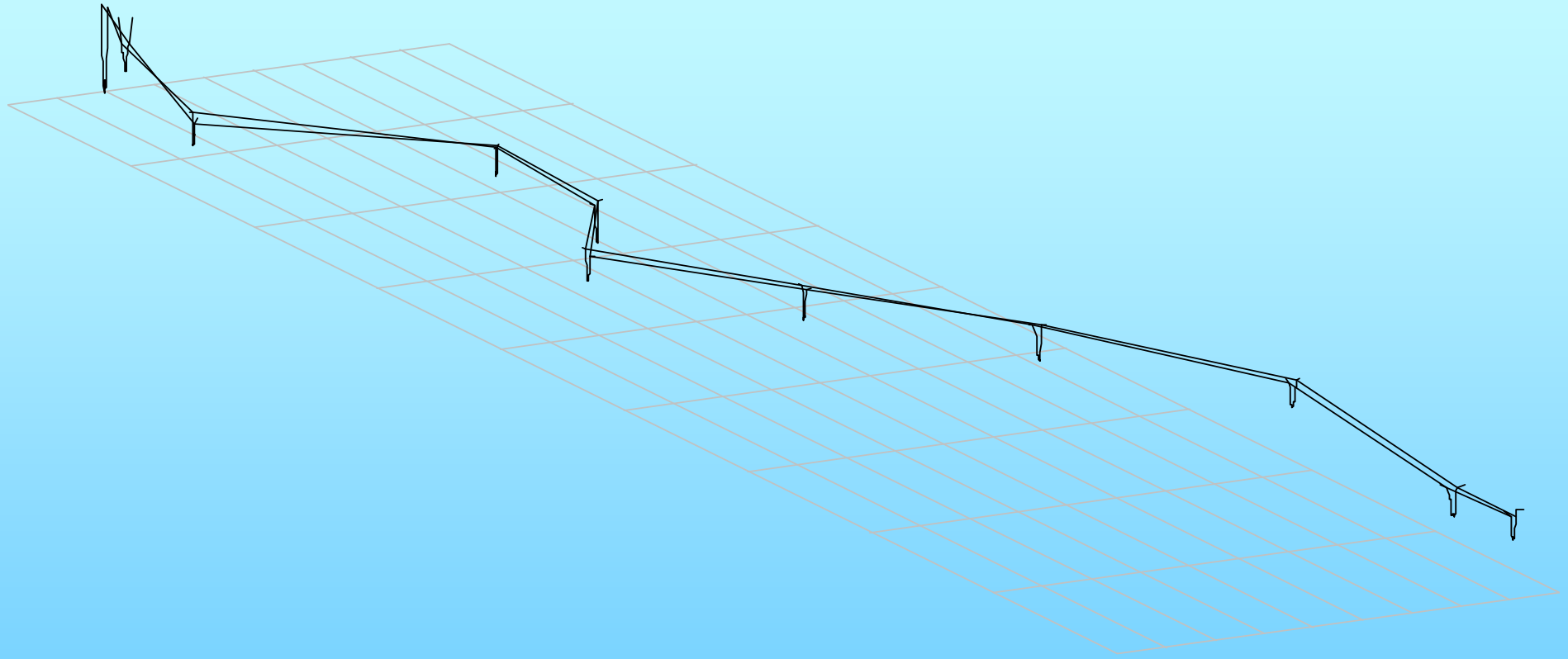
Number of cross sections = 34, distance between each ~200m

# Analyzed cross sections (variant 1)



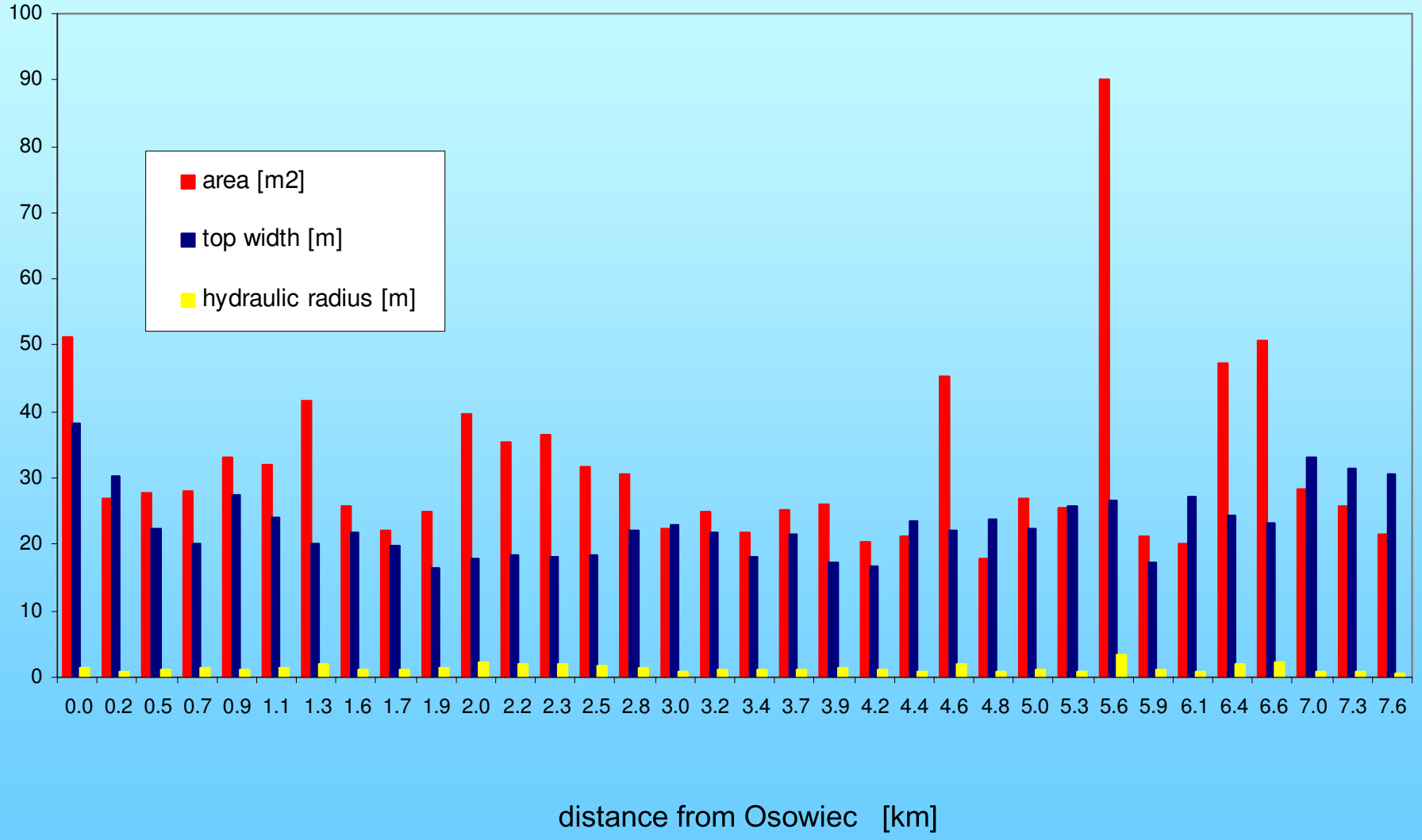
Number of cross sections = 18, distance between each ~ 400m

# Analyzed cross sections (variant 2)

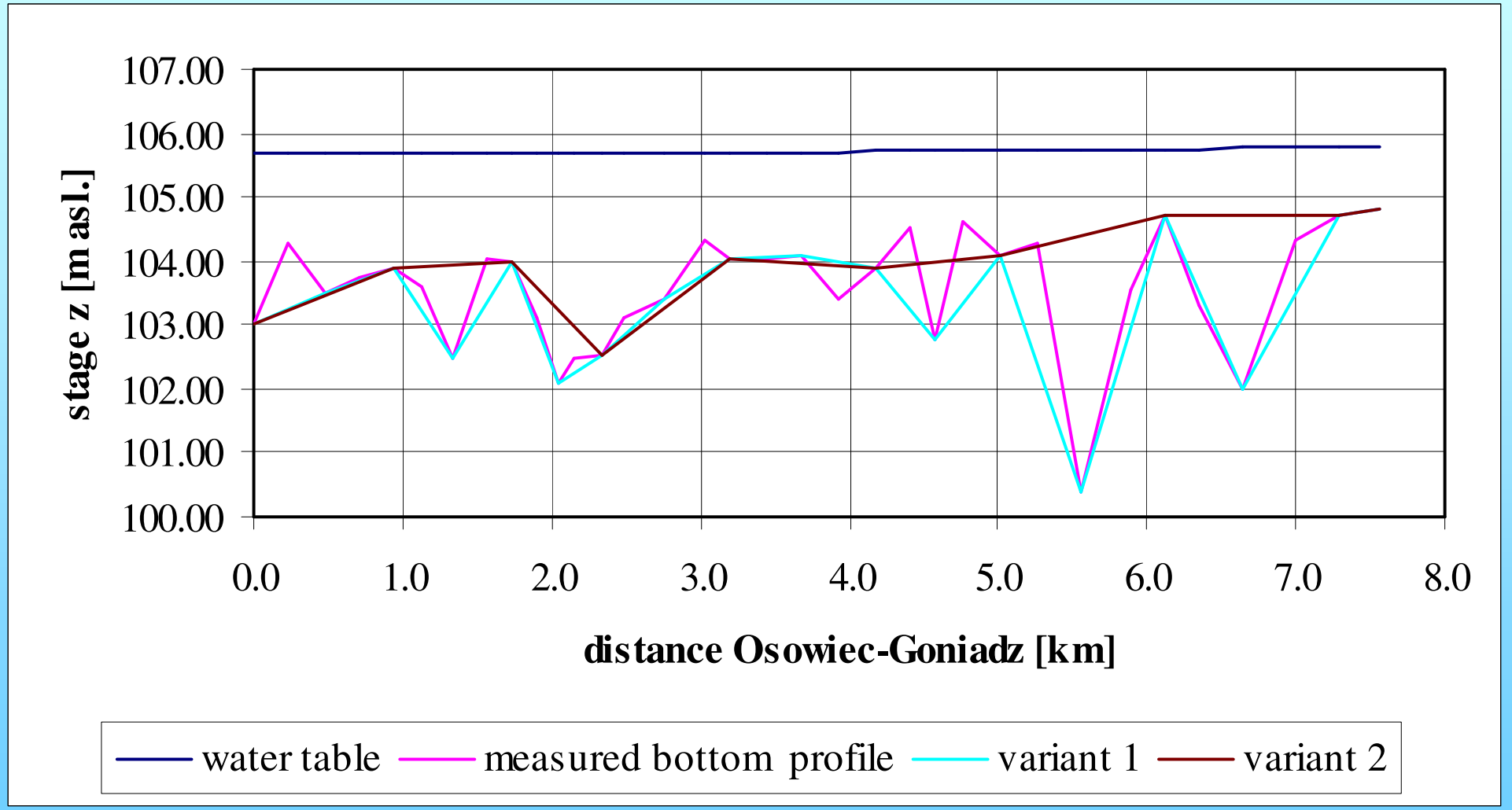


Number of cross sections = 10, distance between each ~ 800m

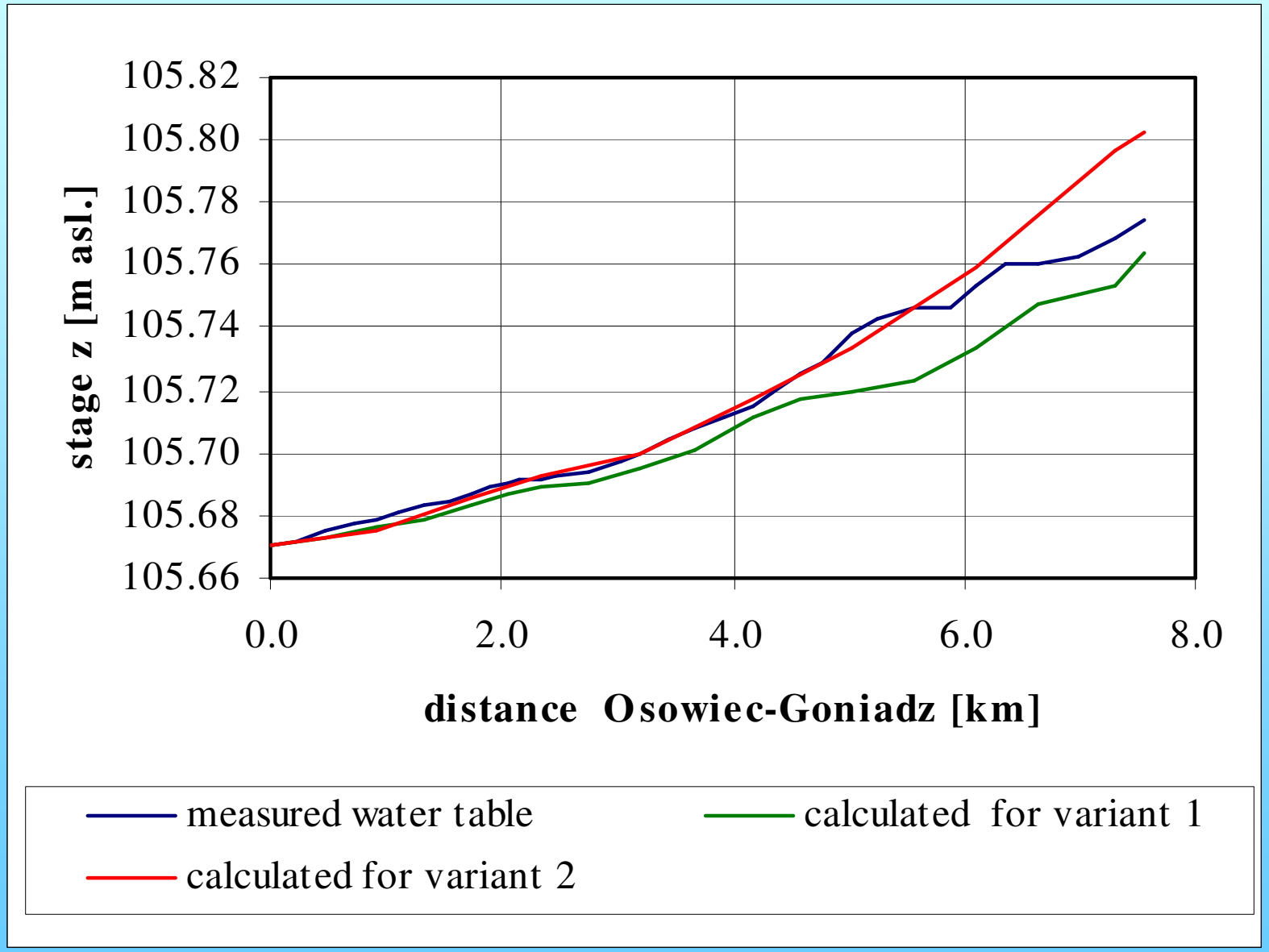
# Hydraulic properties for analyzed cross sections



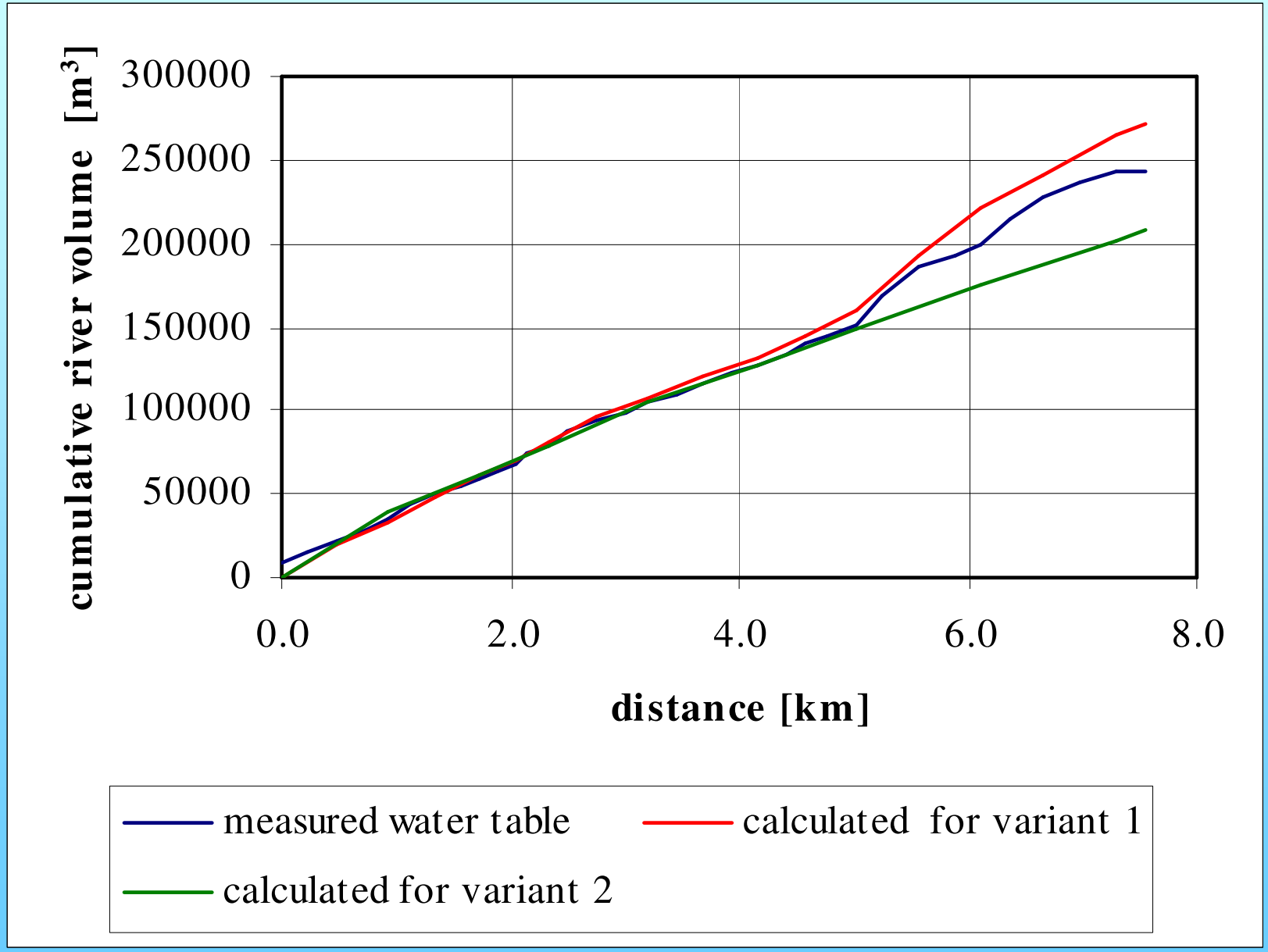
# Bottom profile for analyzed cross sections



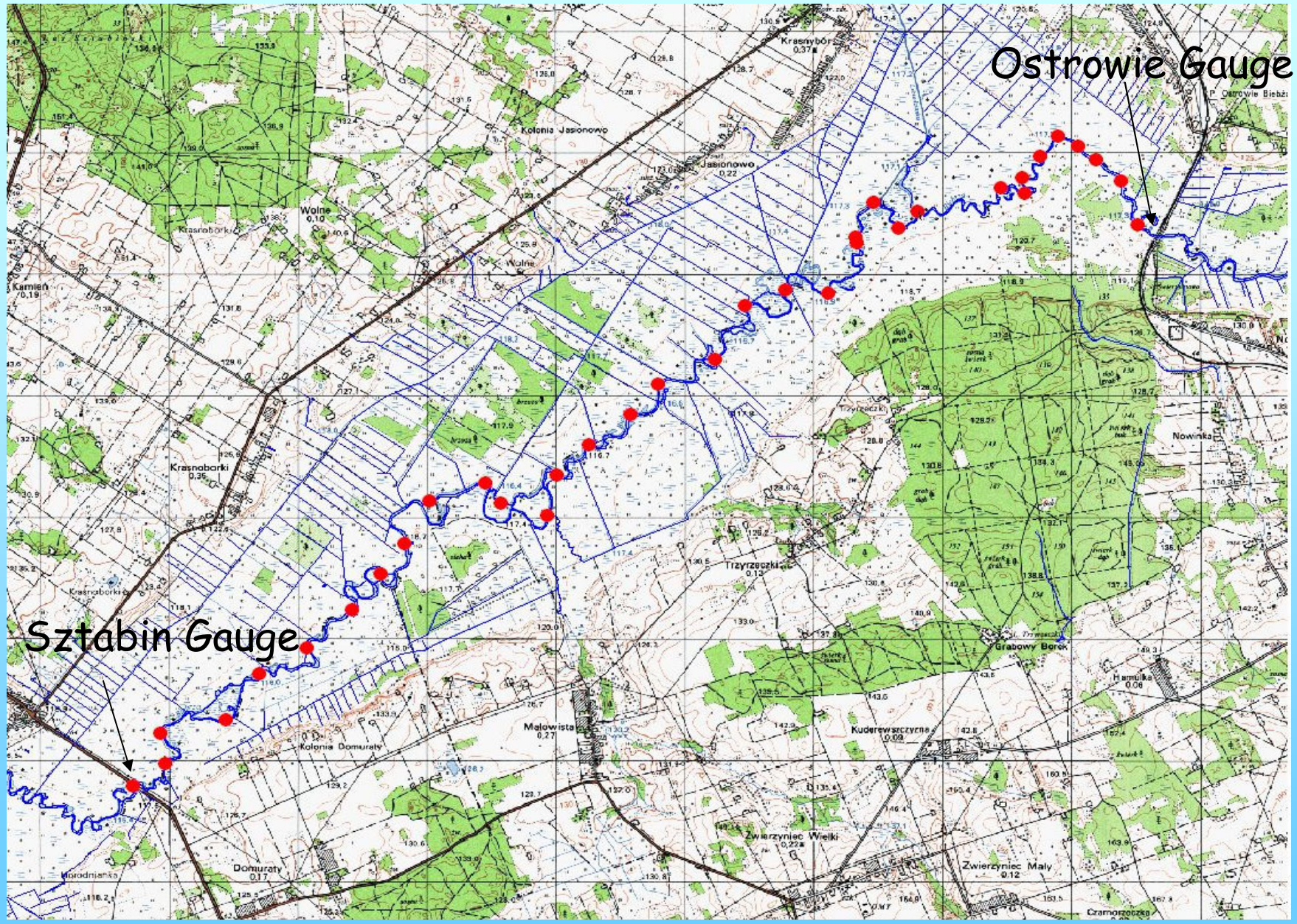
# Calculated water level for analyzed variants



# Cumulative river volume for analyzed variants

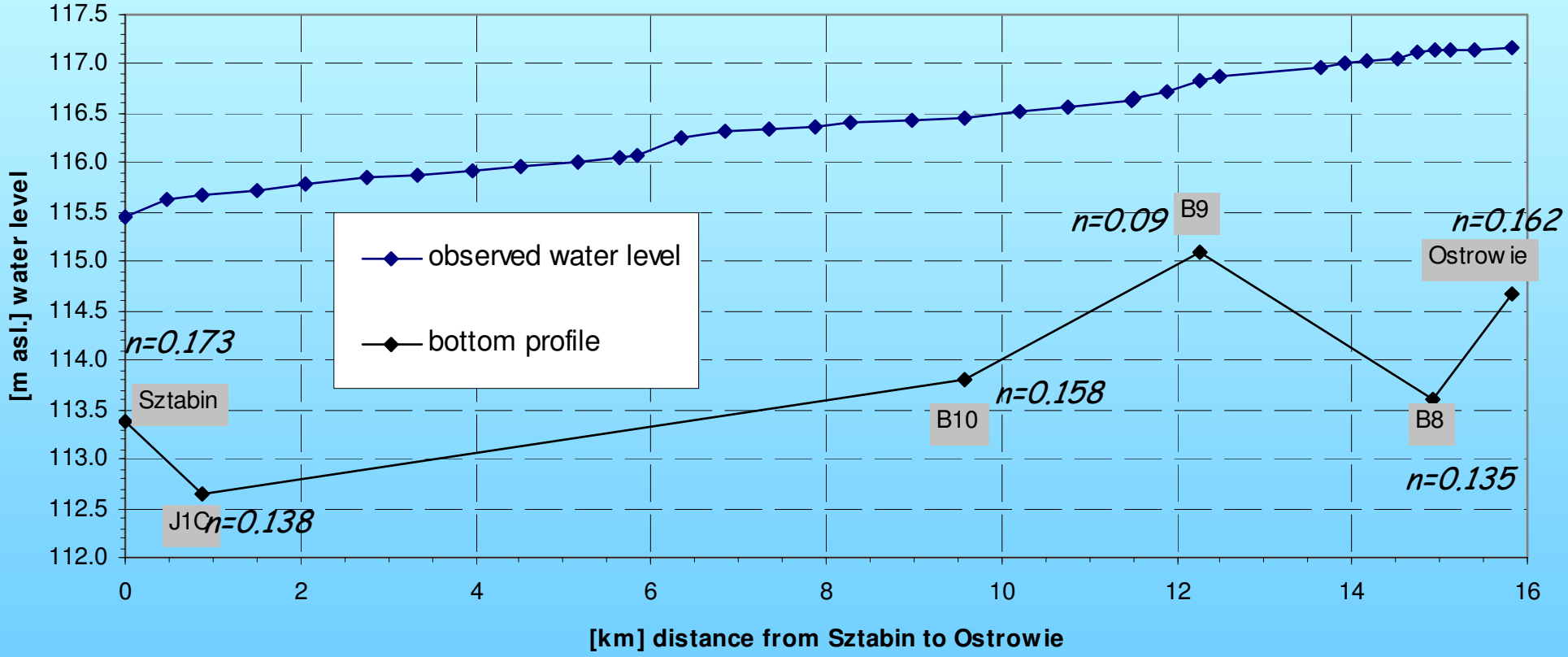


# Biebrza river from Ostrowie to Sztabin (15.82 km)

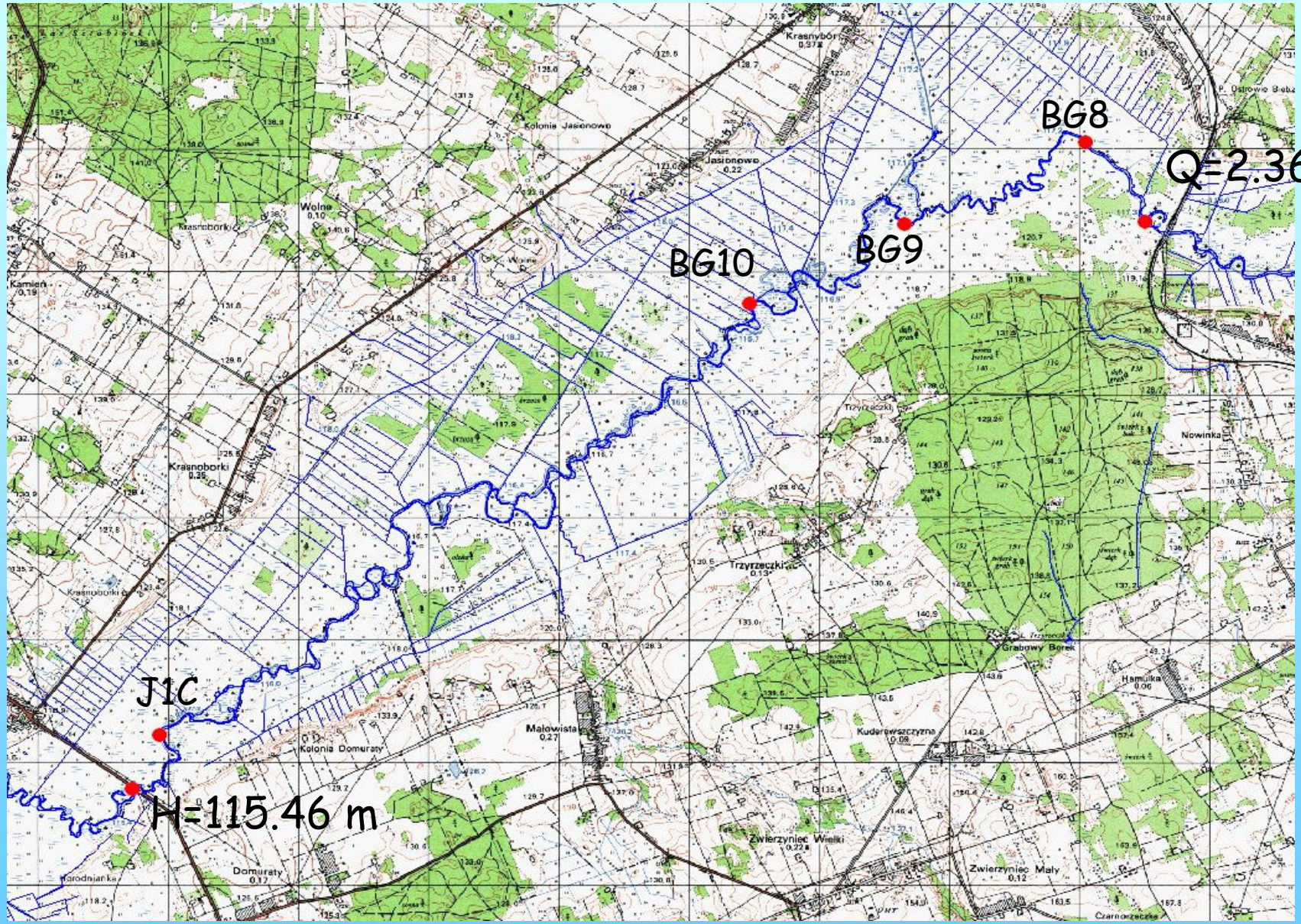



- measured water level by GPS (35 points, 14.05.2003)

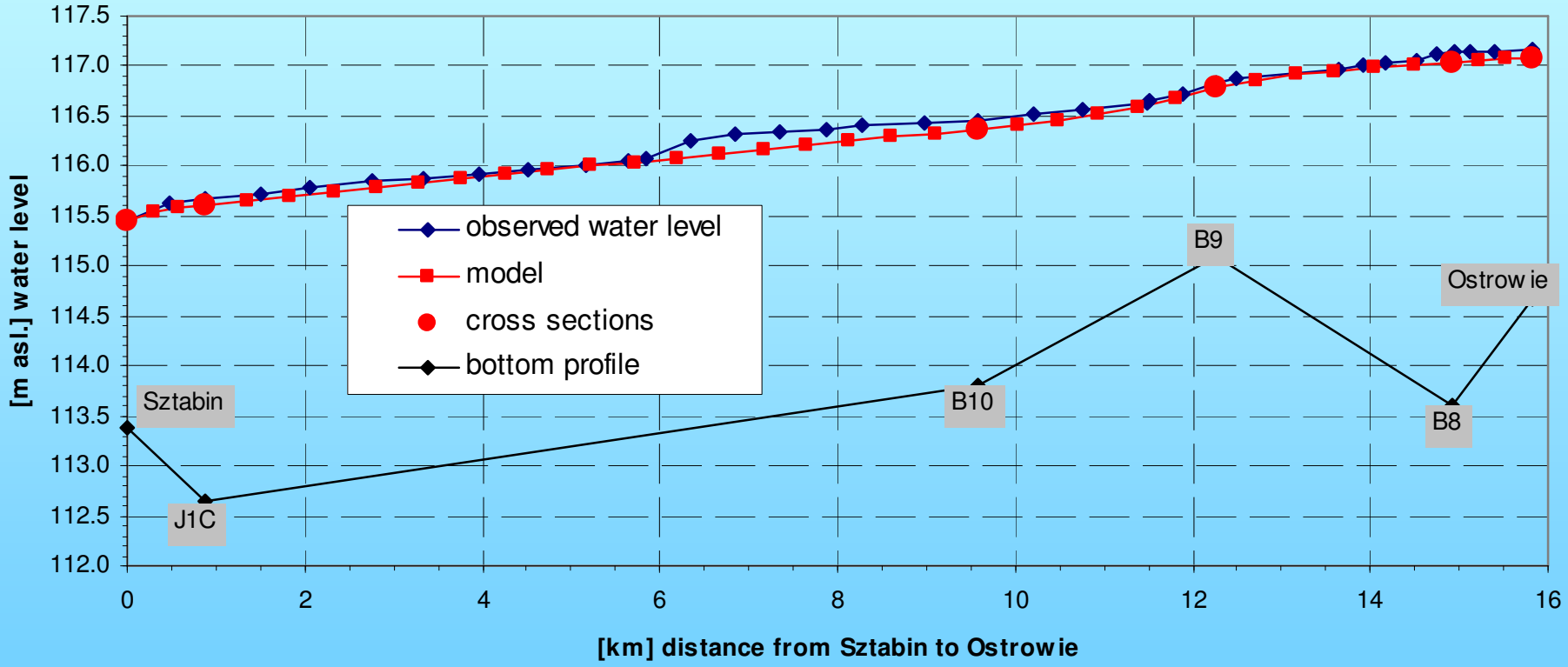
# Biebrza river - water level measured by GPS



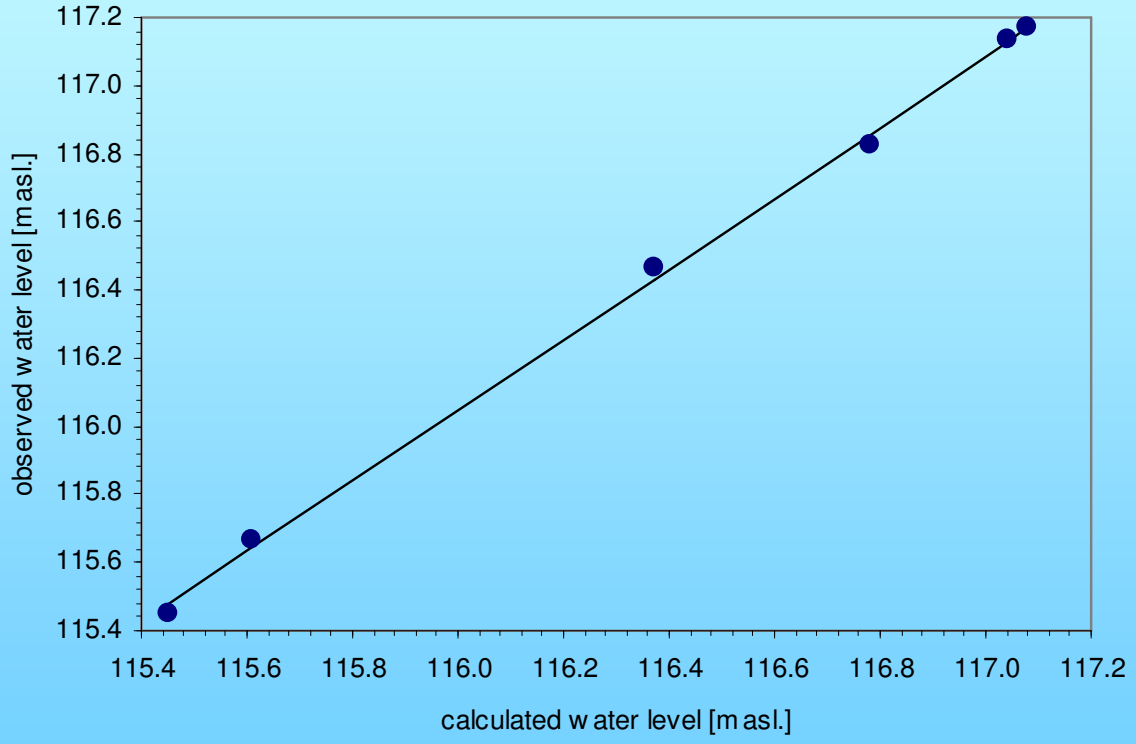
# Boundary conditions and cross sections localization



# Calculated and observed water level (14.05.2003)



# Model error



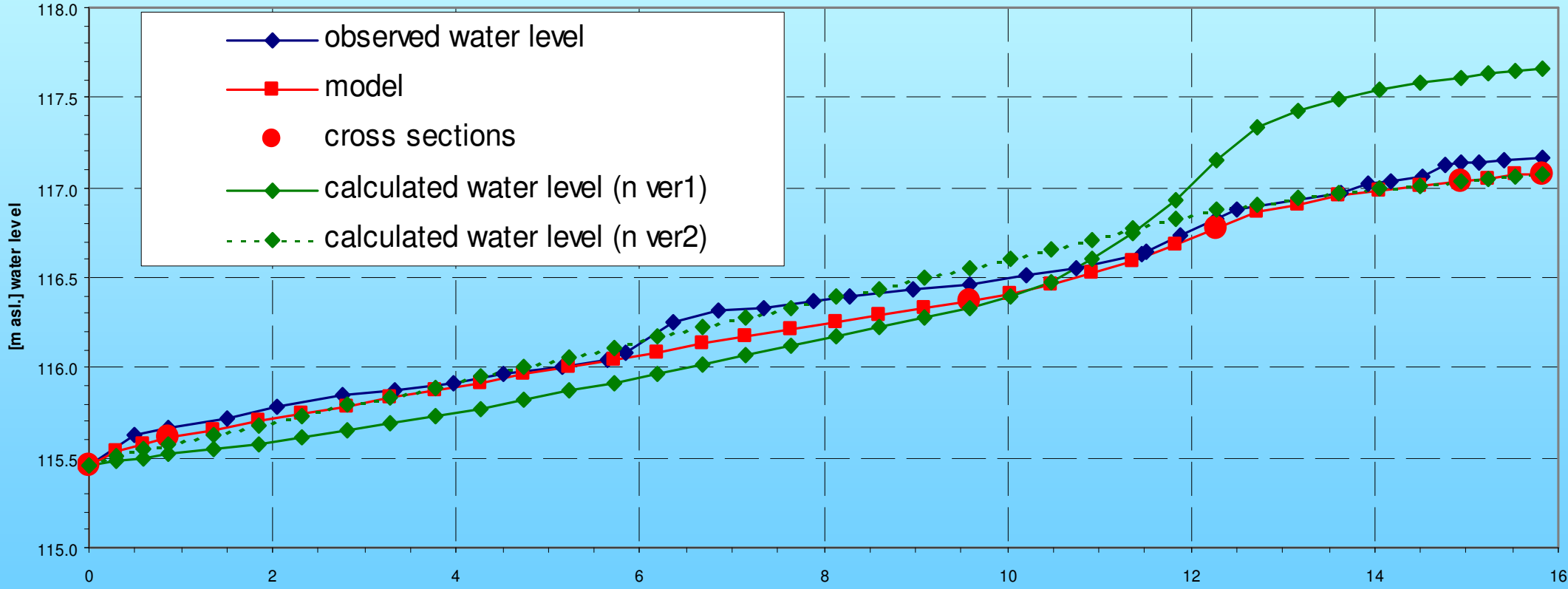

MSE = 0.07cm

# Calculated water level for different estimation of Manning's n value

MSE=0.07cm
$R^2$=0.999

MSE=0.32cm
$R^2$=0.975

MSE=0.08cm
$R^2$=0.987

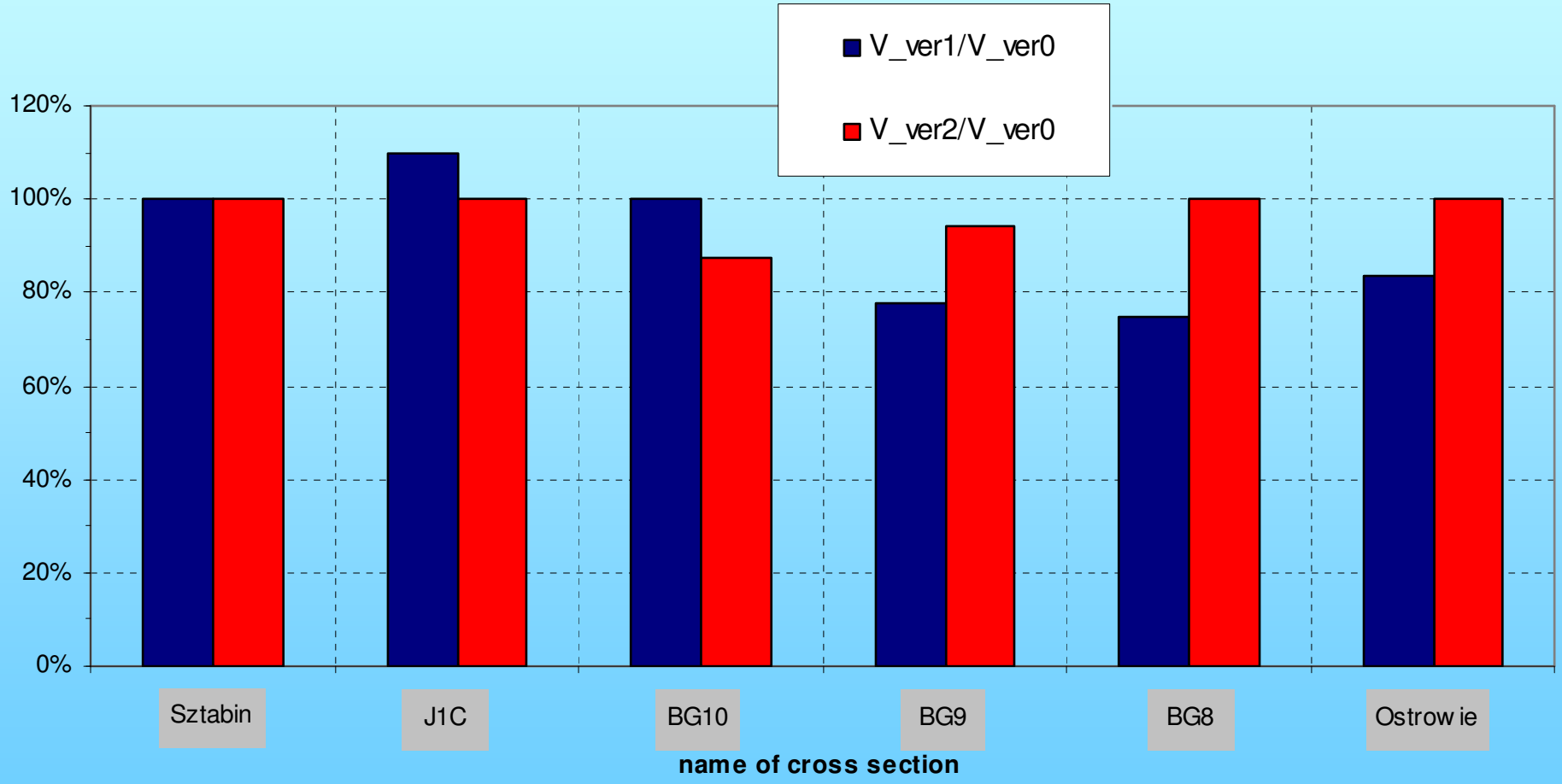



*n=0.173* *n=0.138* *n=0.158* *n=0.090* *n=0.135* *n=0.162*

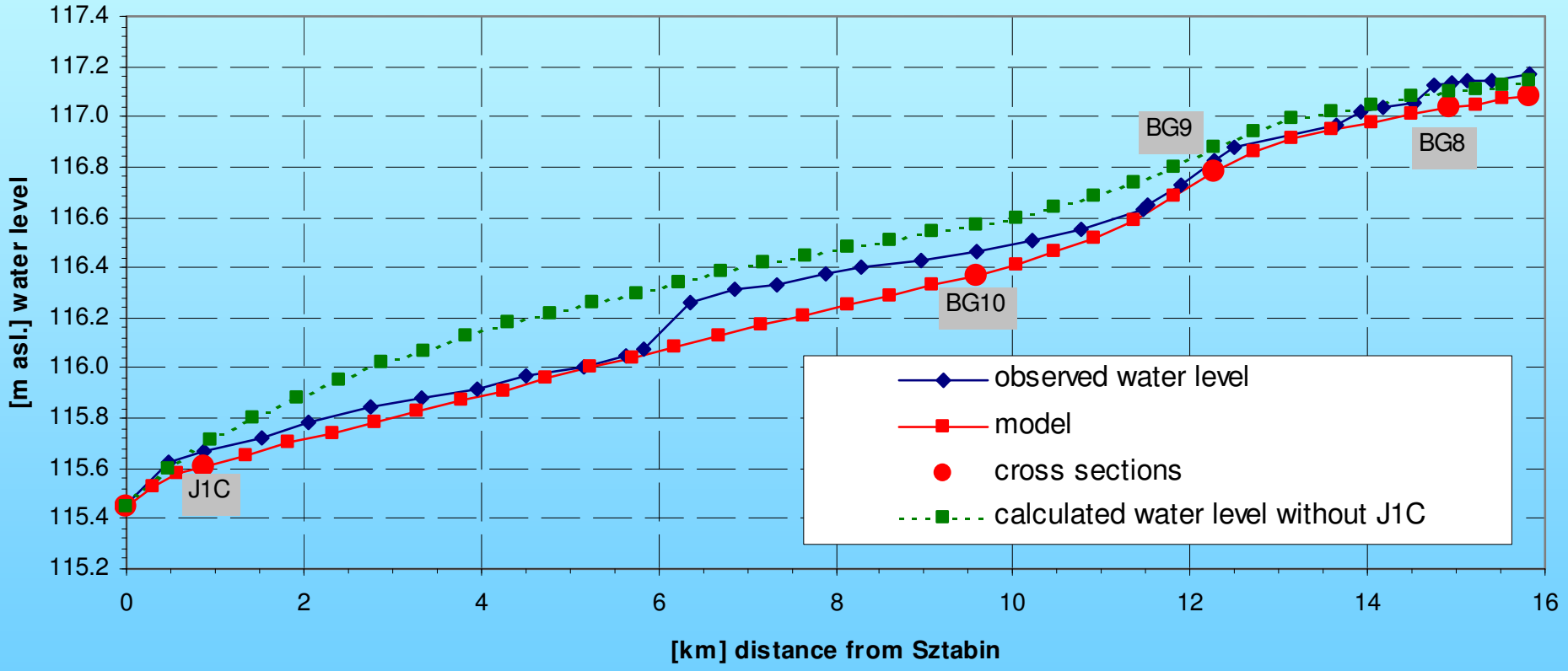
*n=0.098* *n=0.105* *n=0.178* *n=0.201* *n=0.223* *n=0.230*

*n=0.147* *n=0.142* *n=0.211* *n=0.066* *n=0.122* *n=0.142*

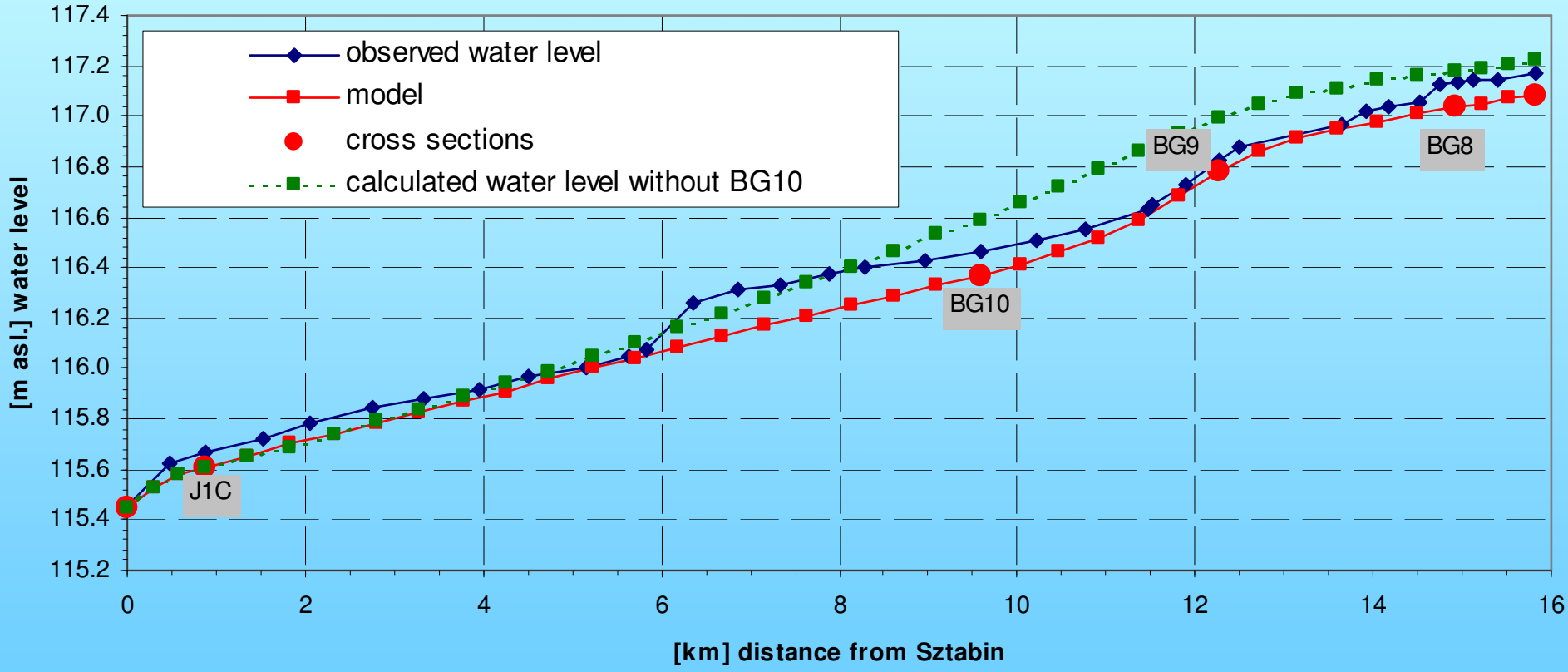
# Influence of different estimations of friction slope for calculated velocity



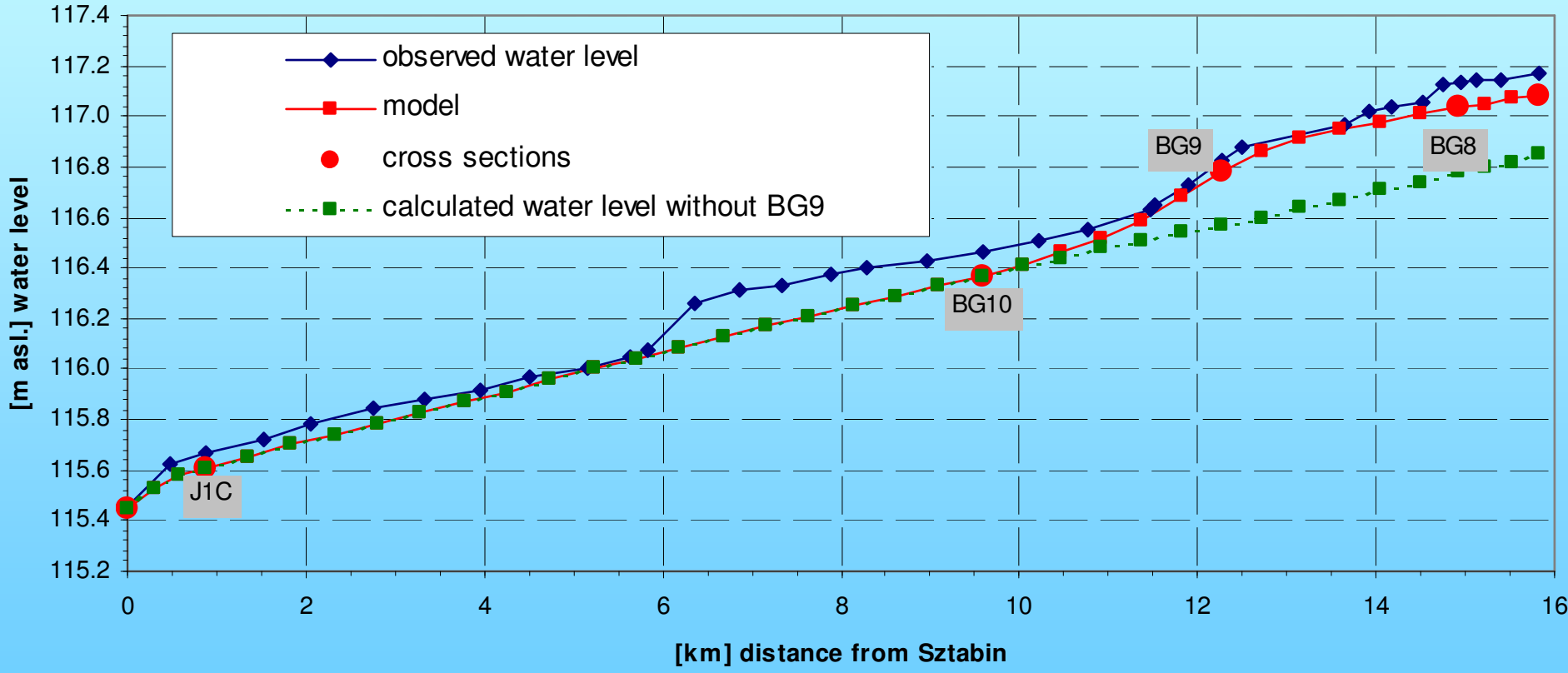
# Influence of J1C cross section on calculated water level



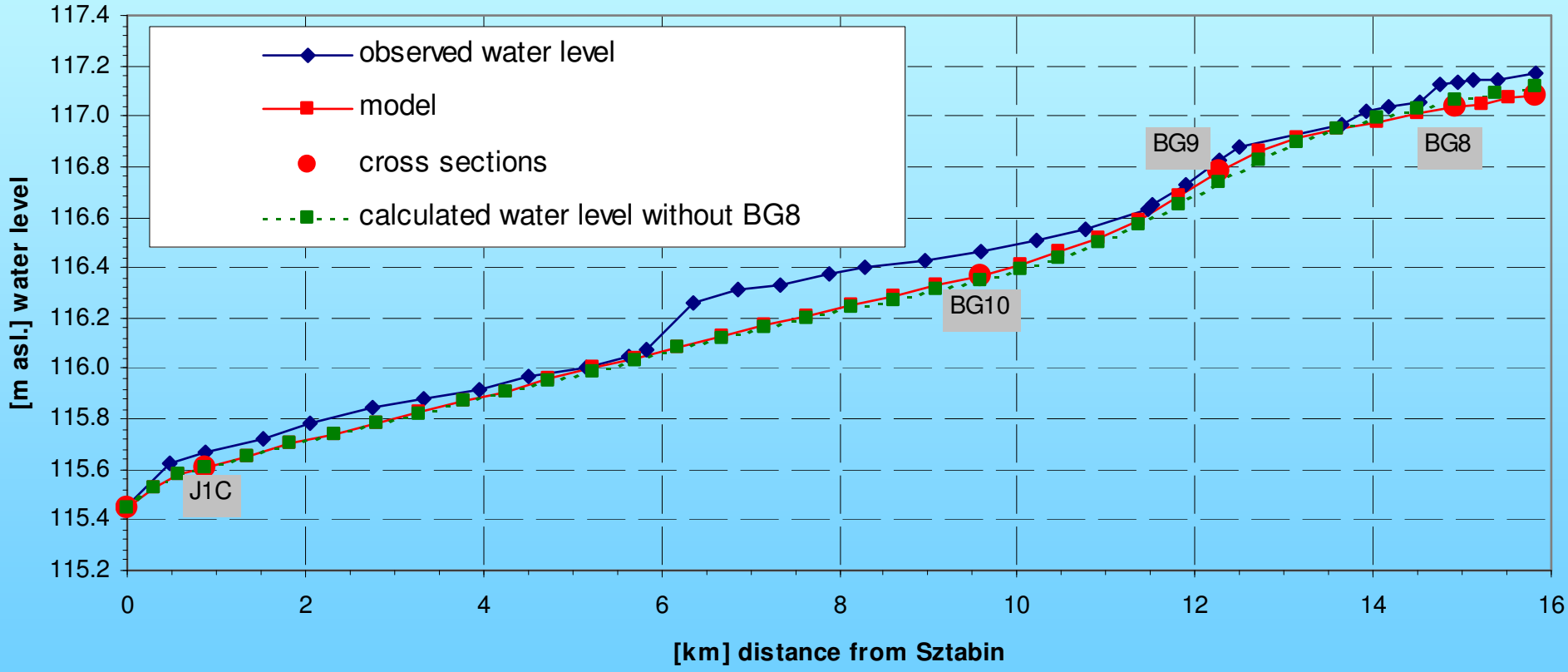
# Influence of BG10 cross section on calculated water level



# Influence of BG9 cross section on calculated water level



# Influence of BG8 cross section on calculated water level



# Conclusions

- ✓Friction slope in Manning's equation should be calculated from local water level.
- ✓Correct gap cross sections by modification *n* value can generate crucial errors in model.
- ✓The best way to optimal representation of river geometry in a model is made a water level profile and bottom profile along analyzed reach.