Estimating River Discharge from Aerial Imagery

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Global Decline in River Gauging Stations

http://www.bafg.de/GRDC
The Rise of Remote Sensing of River Discharge

Pros
- Remotely sensed
- Global coverage
- Low operational cost

Cons
- Coarse resolution
- Weather interference
- High initial costs
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Hydraulic Modeling

Elevation

Distance across river
Estimating Discharge

Aerial Imagery

Model Output
Hydraulic Modeling

Observed Discharge: 2.8 m$^3$ s$^{-1}$
Modeled Discharge: 2.8 m$^3$ s$^{-1}$
Hydraulic Modeling

River Kilometer: 35  
River Kilometer: 22  
River Kilometer: 13
Conclusion

• River discharge can be accurately estimated through coupling of high resolution aerial imagery, photogrammetry, and hydraulic modeling

Significance

• This provides an opportunity to extend and densify our current gauging station network while avoiding issues with satellite based remote sensing

Limitations

• Requires:
  • A clear view of the channel (minimal overhanging vegetation)
  • Assumptions about basic channel shape
  • Wide range of widths in response to discharge

Next Steps

Thank you

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