



Versauerungsmonitoring Seen- Historie und Entwicklung



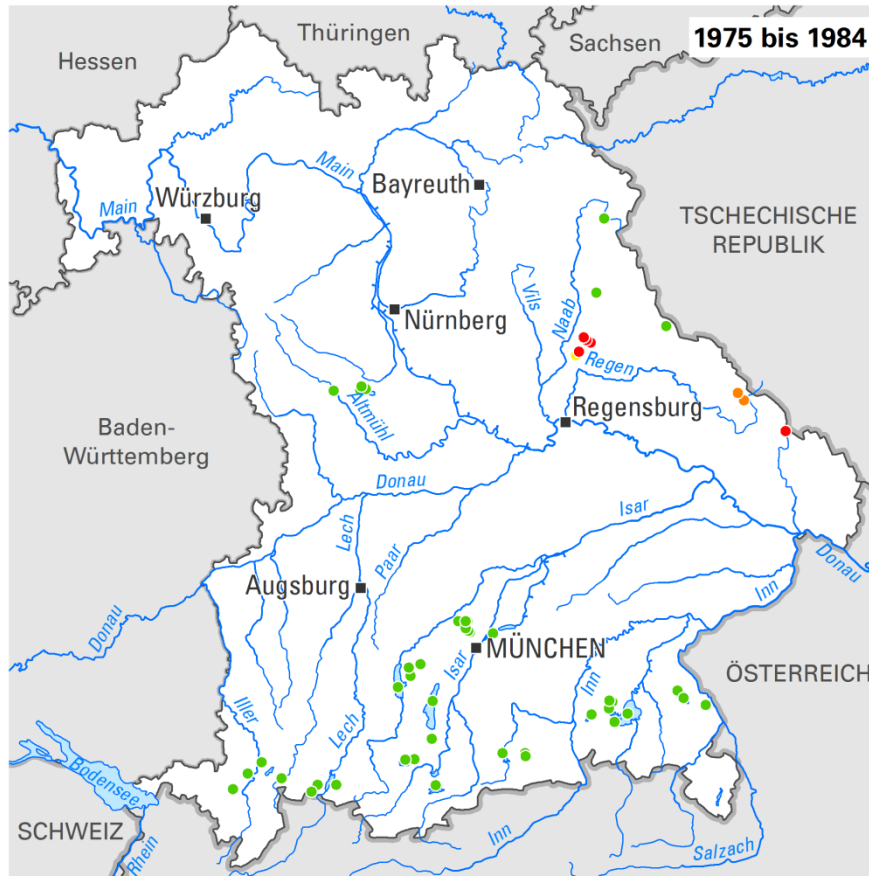
25 Jahre Versauerungsmonitoring in Bayern
Symposium am 04./05.11.2014

Dr. Jochen Schaumburg

Versauerungsmonitoring Seen - Gewässerchemie

- Übersicht Versauerung bayerische Seen
- Entwicklung ausgewählter Messgrößen in 4 Seen, Zu- und Abflüssen
- Zusammenfassung - Ausblick

Übersicht Versauerung bayerische Seen - Entwicklung pH-Wert



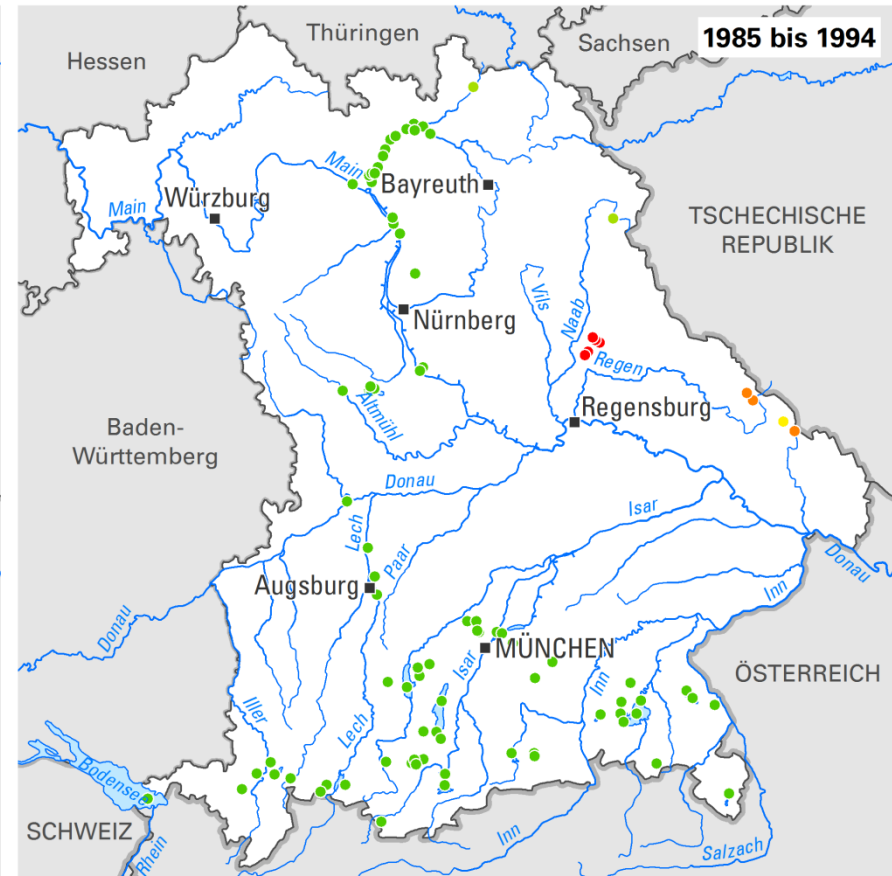
Geobasisdaten: DLM 1000, © GeoBasis-DE / BKG 2013 (Daten verändert)

0 50 km

Seen

pH-Wert (Mittelwert)

• < 4,5 • 4,5 bis < 5,5 • 5,5 bis < 6,5 • 6,5 bis < 7,5 • ≥ 7,5



Geobasisdaten: DLM 1000, © GeoBasis-DE / BKG 2013 (Daten verändert)

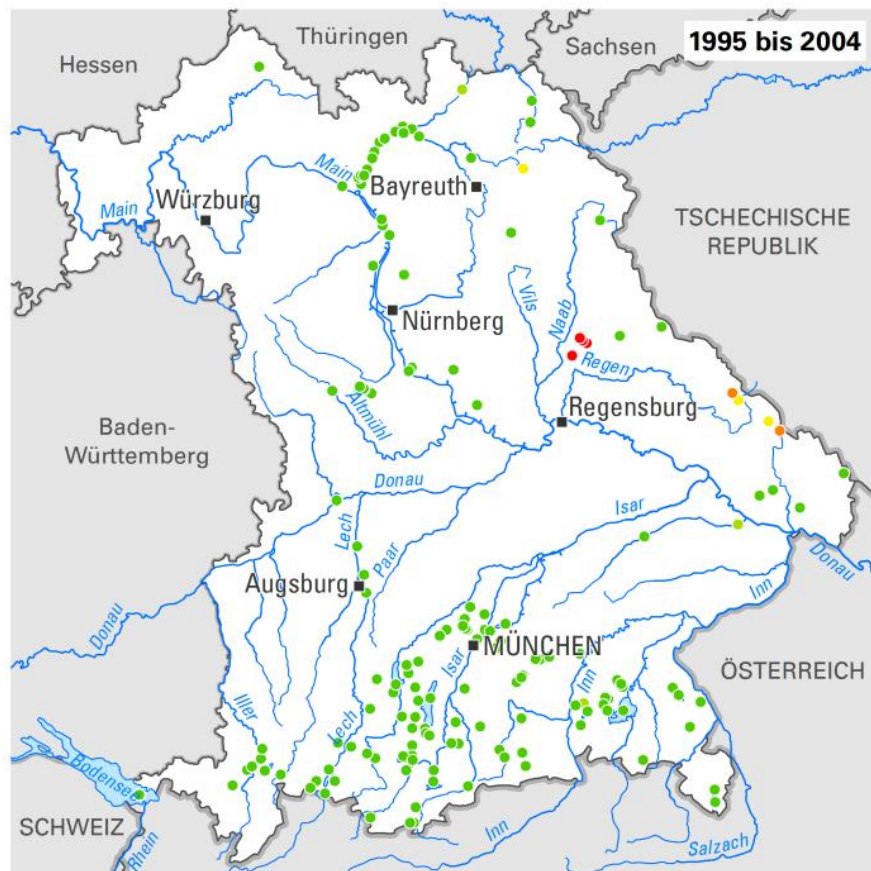
0 50 km

Seen

pH-Wert (Mittelwert)

• < 4,5 • 4,5 bis < 5,5 • 5,5 bis < 6,5 • 6,5 bis < 7,5 • ≥ 7,5

Übersicht Versauerung bayerische Seen - Entwicklung pH-Wert



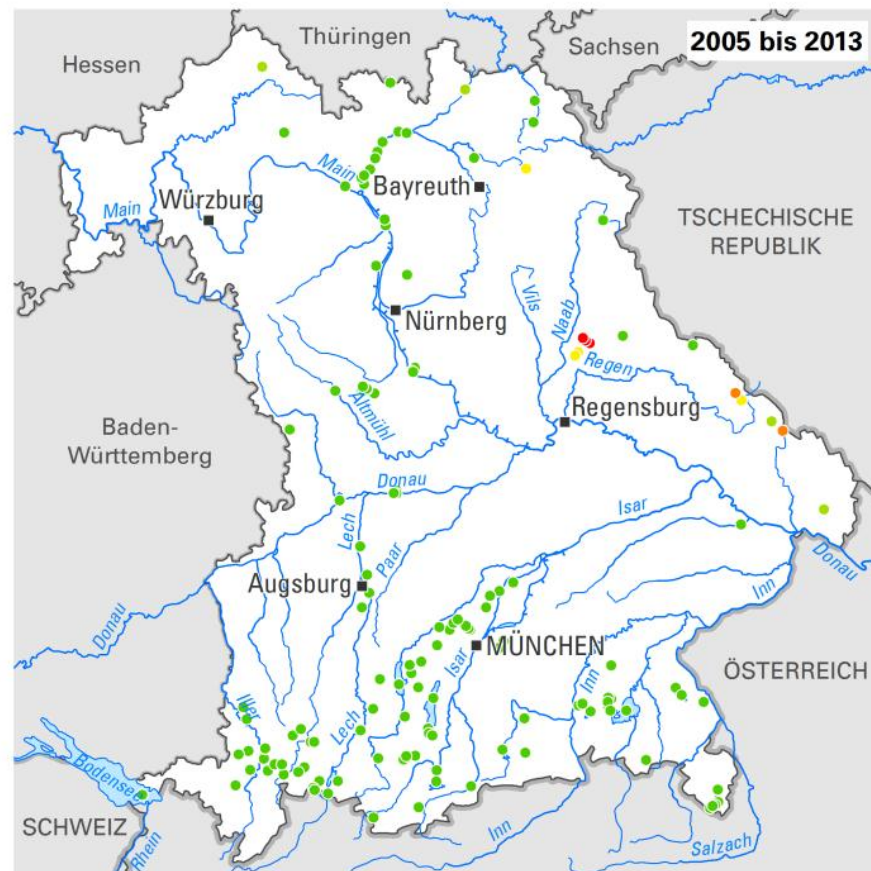
Geobasisdaten: DLM 1000, © GeoBasis-DE / BKG 2013 (Daten verändert)

0 50 km

Seen

pH-Wert (Mittelwert)

• < 4,5 • 4,5 bis < 5,5 • 5,5 bis < 6,5 • 6,5 bis < 7,5 • ≥ 7,5



Geobasisdaten: DLM 1000, © GeoBasis-DE / BKG 2013 (Daten verändert)

0 50 km

Seen

pH-Wert (Mittelwert)

• < 4,5 • 4,5 bis < 5,5 • 5,5 bis < 6,5 • 6,5 bis < 7,5 • ≥ 7,5

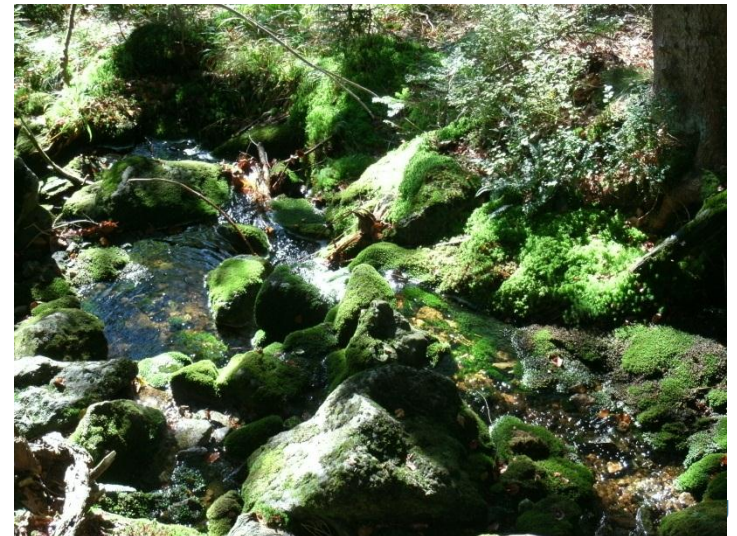
Rachelsee

Fläche (ha): 5,7
Tiefe (m): 13
Höhe ü.NN (m): 1.070,5

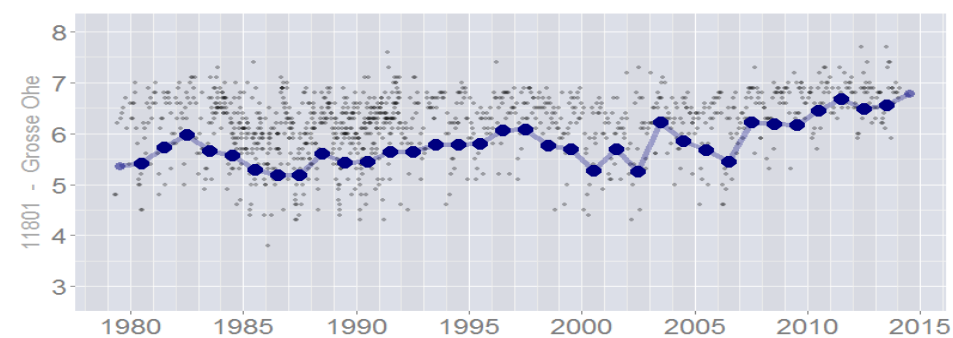
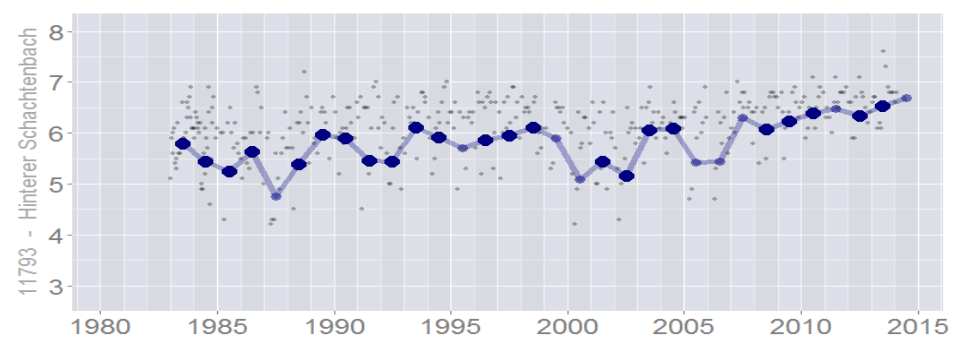
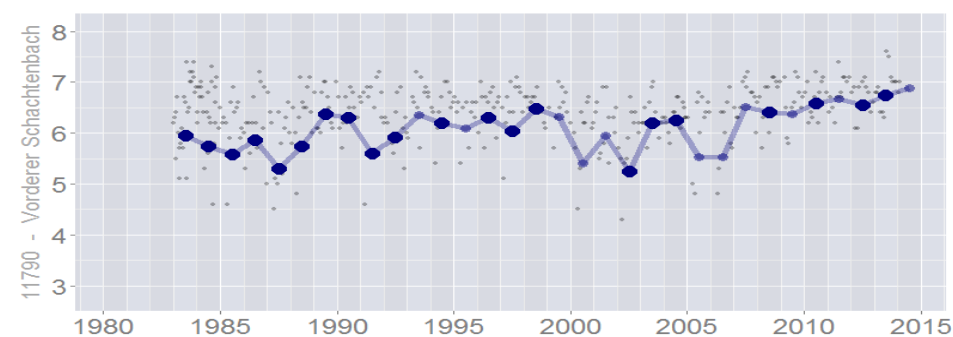
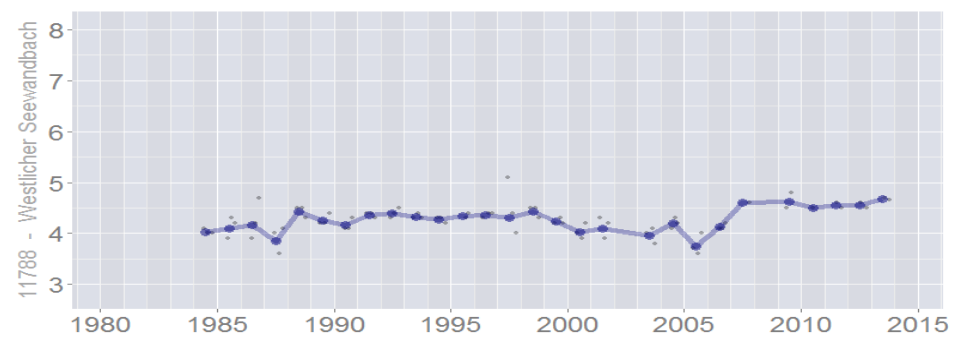
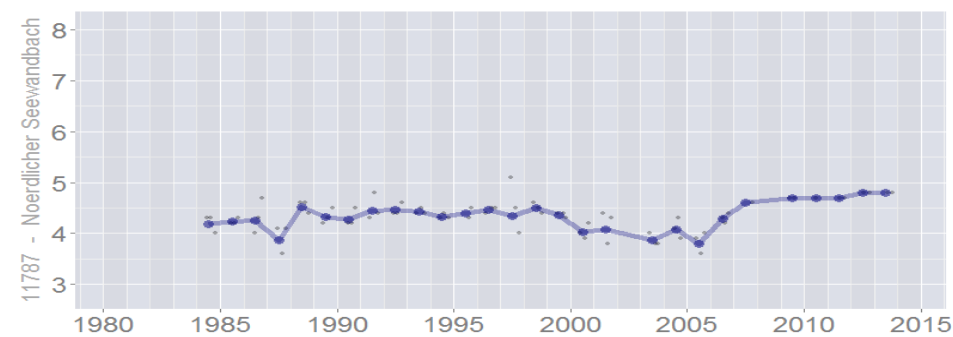
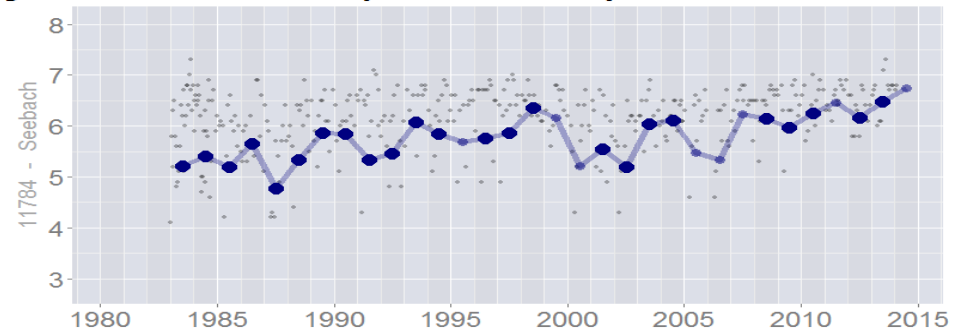
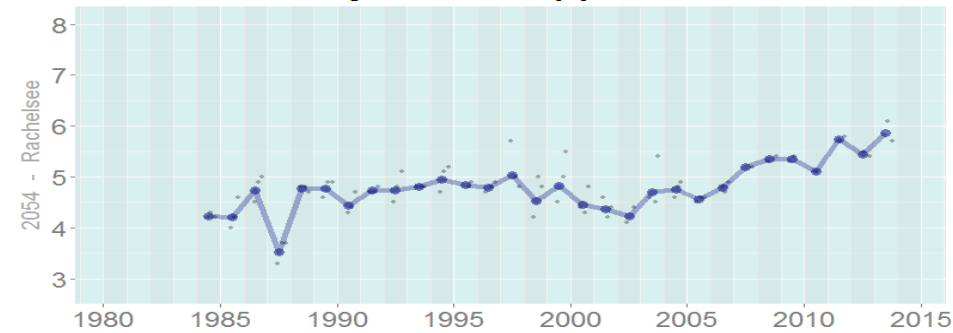
Nördl. Seewandbach



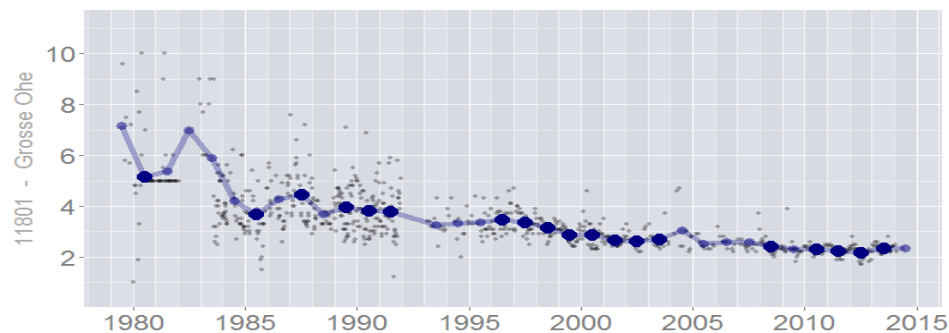
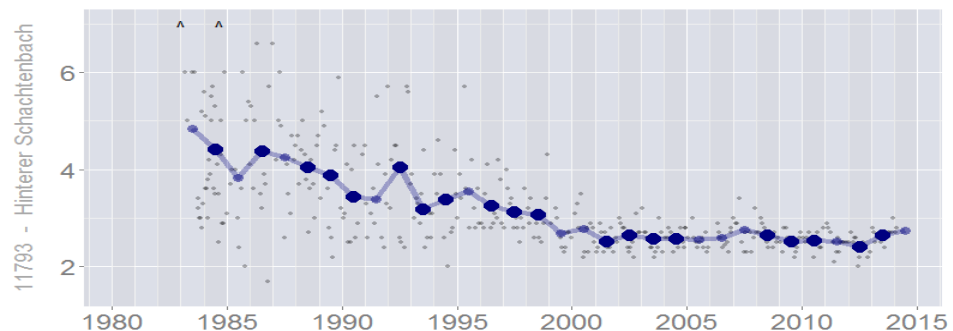
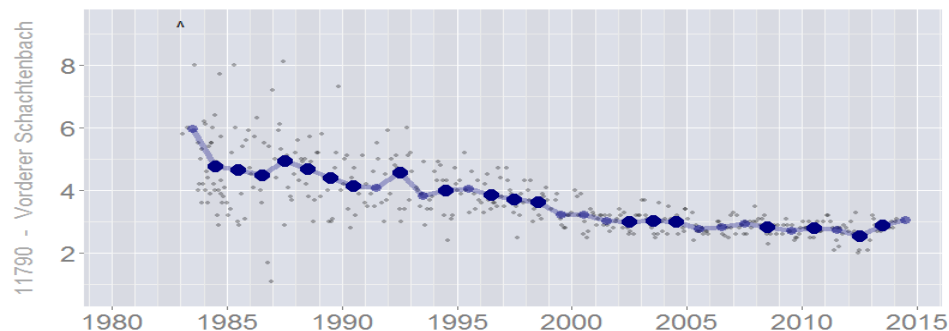
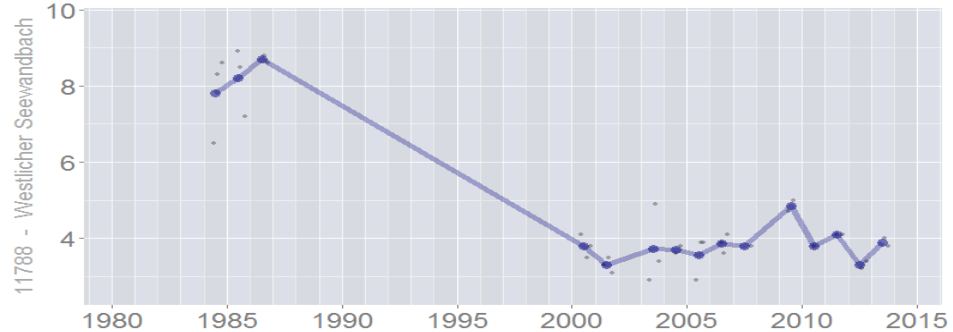
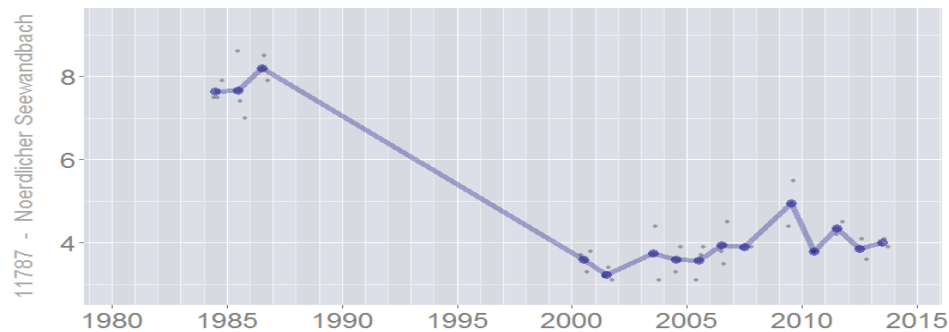
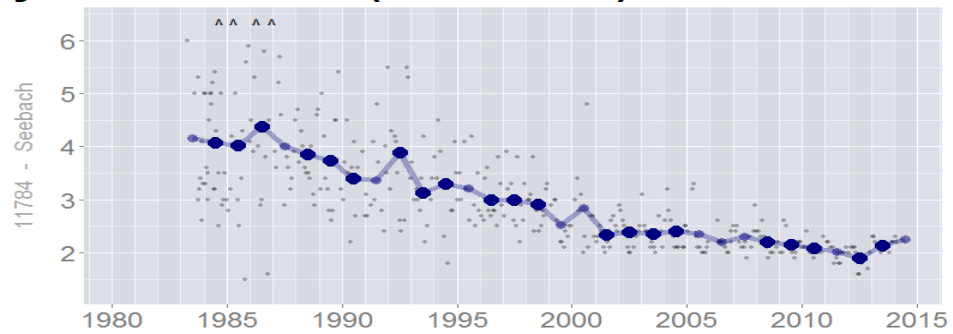
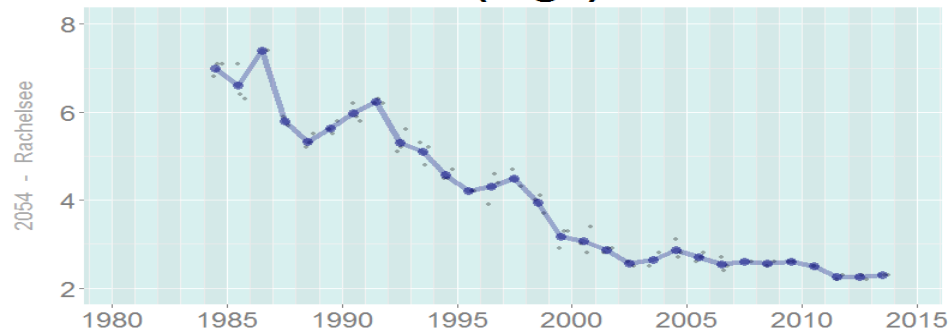
Westl. Seewandbach



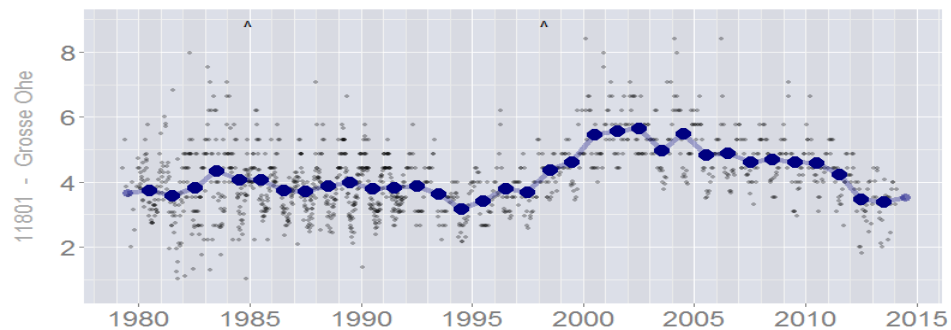
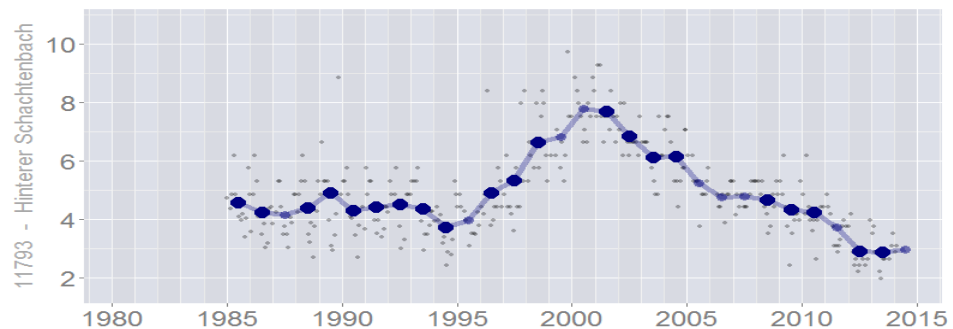
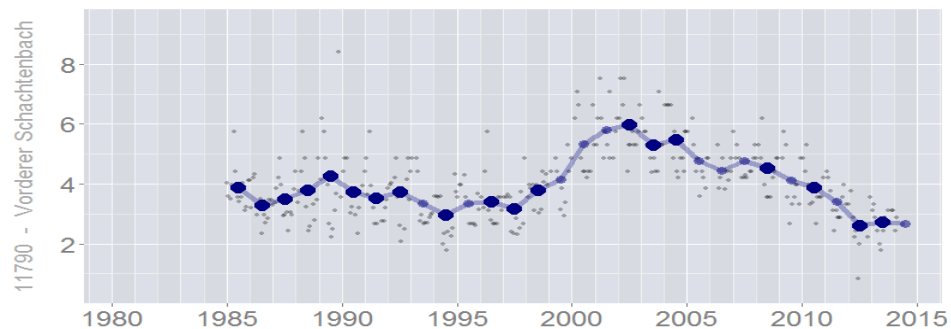
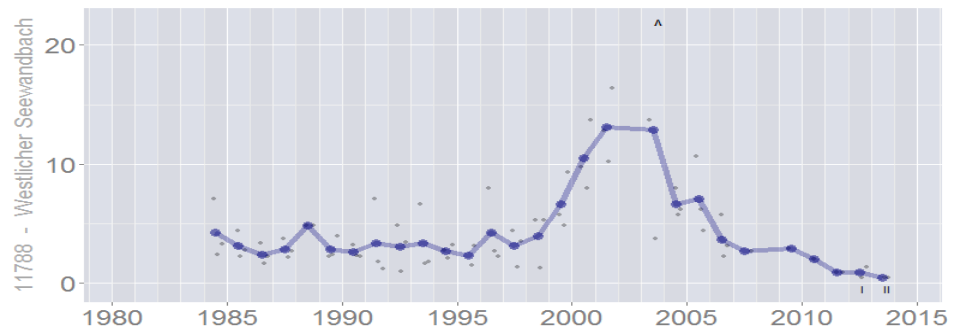
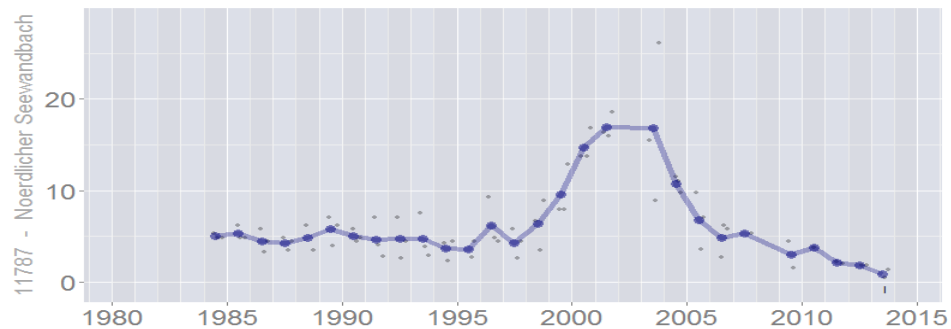
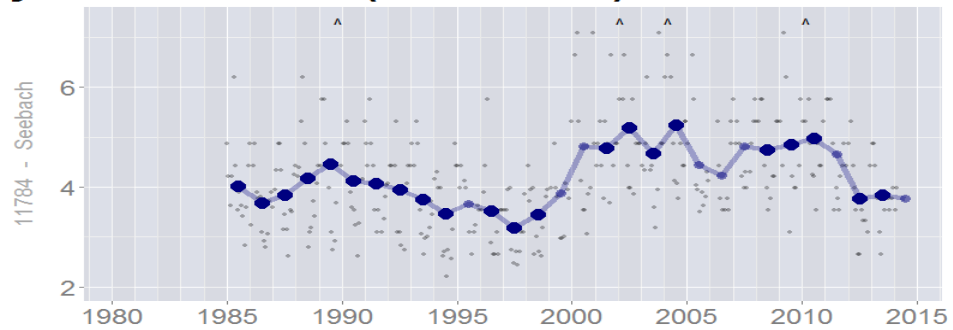
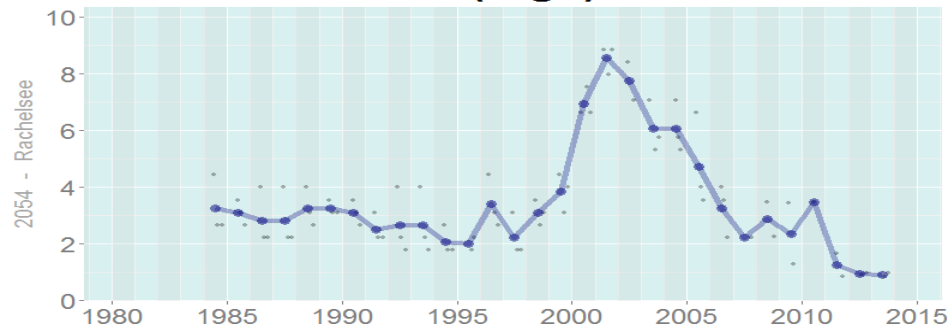
pH-Wert (-) - Gewässer - Bayerischer Wald (Rachelsee)



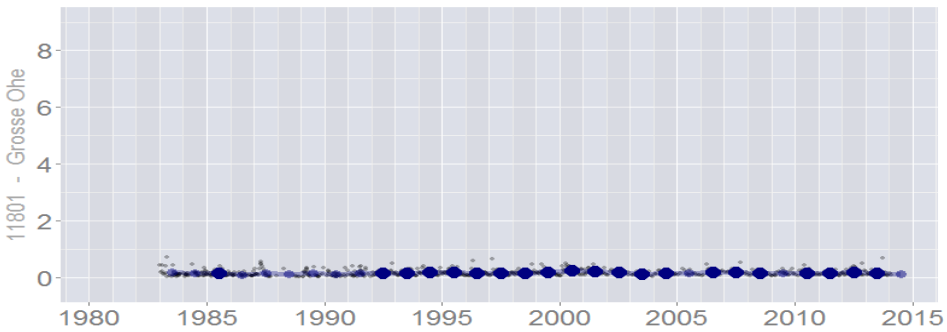
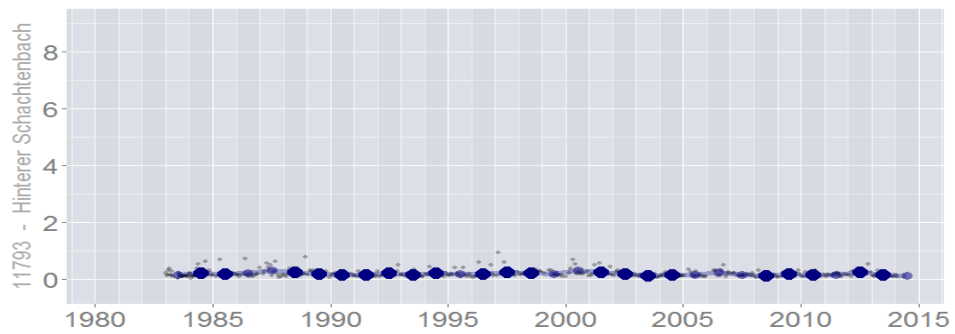
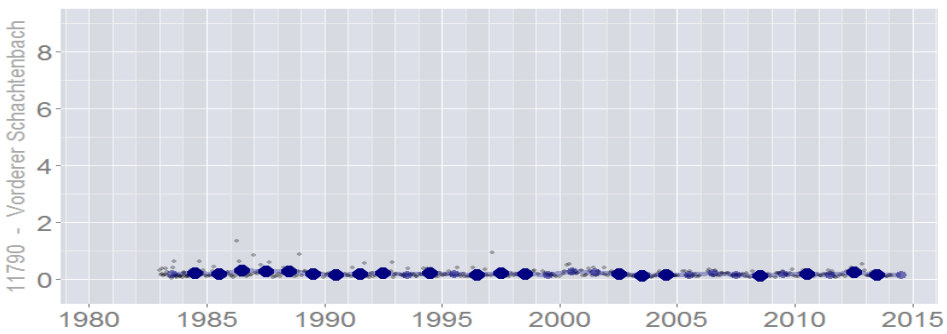
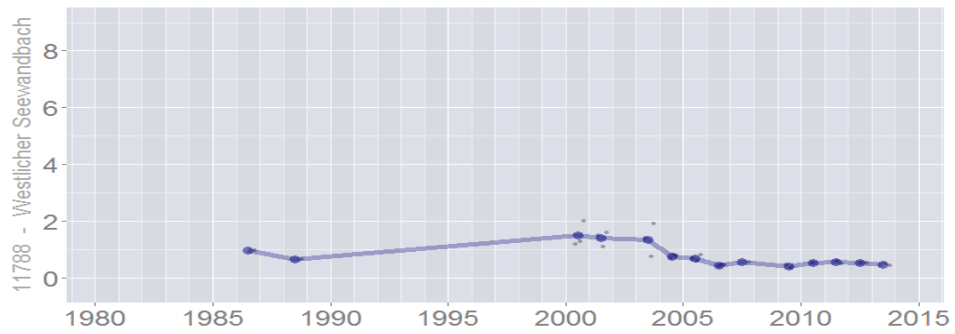
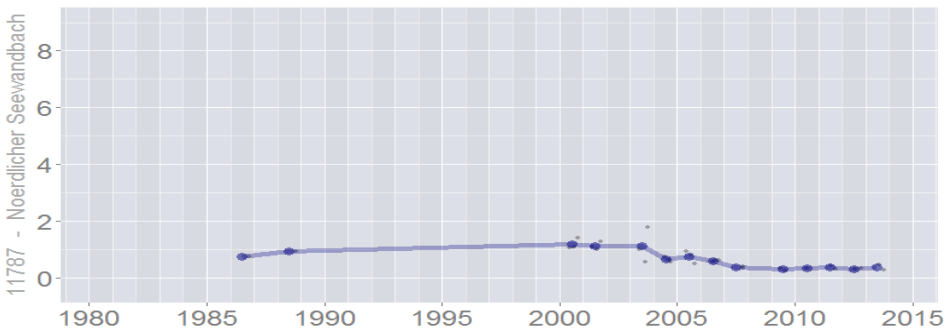
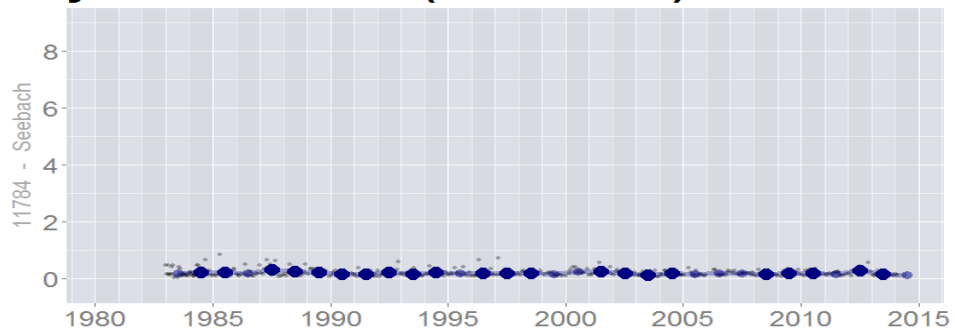
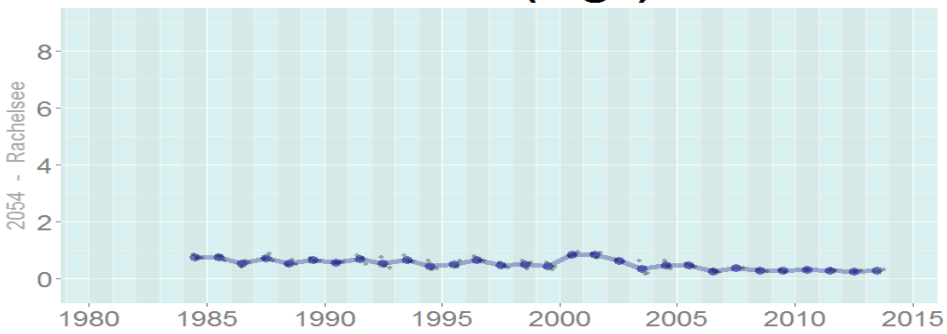
Sulfat (mg/l) - Gewässer - Bayerischer Wald (Rachelsee)



Nitrat (mg/l) - Gewässer - Bayerischer Wald (Rachelsee)



Aluminium (mg/l) - Gewässer - Bayerischer Wald (Rachelsee)



Großer Arbersee

Fläche (ha): 6,85
Tiefe (m): 15
Höhe ü.NN (m): 934,0

Kleiner Arbersee



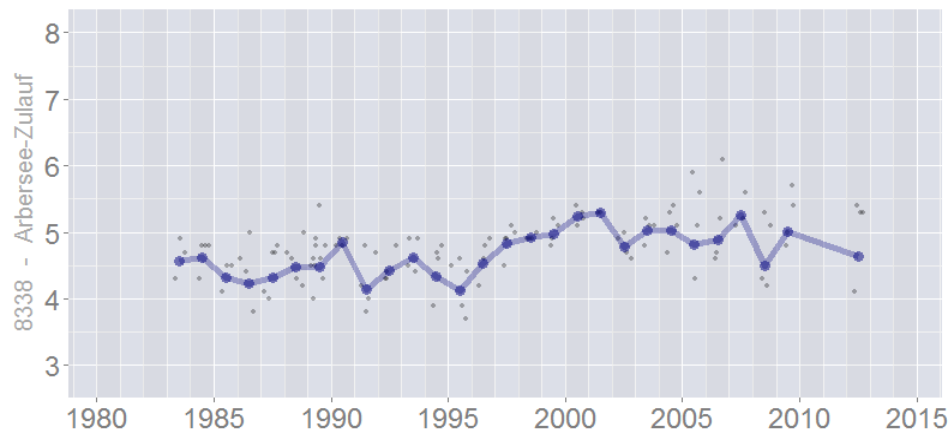
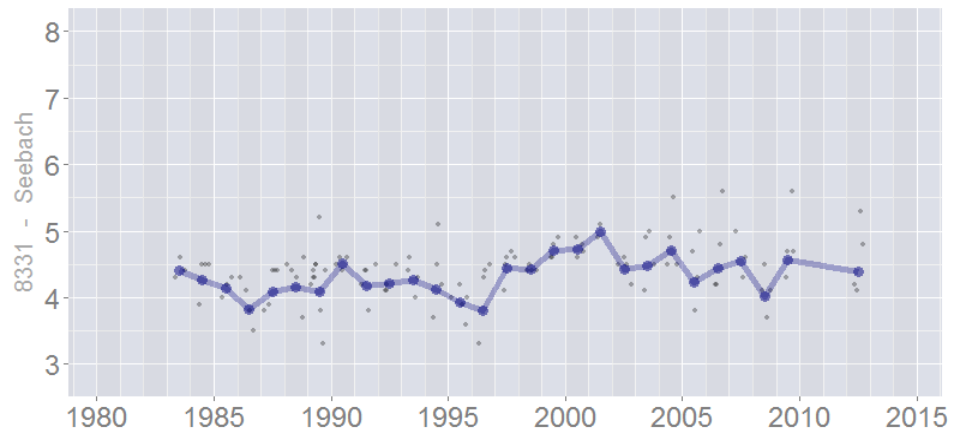
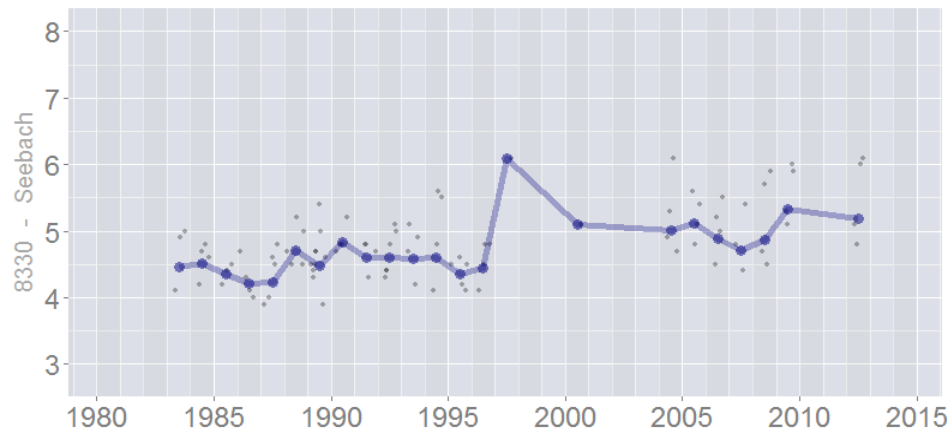
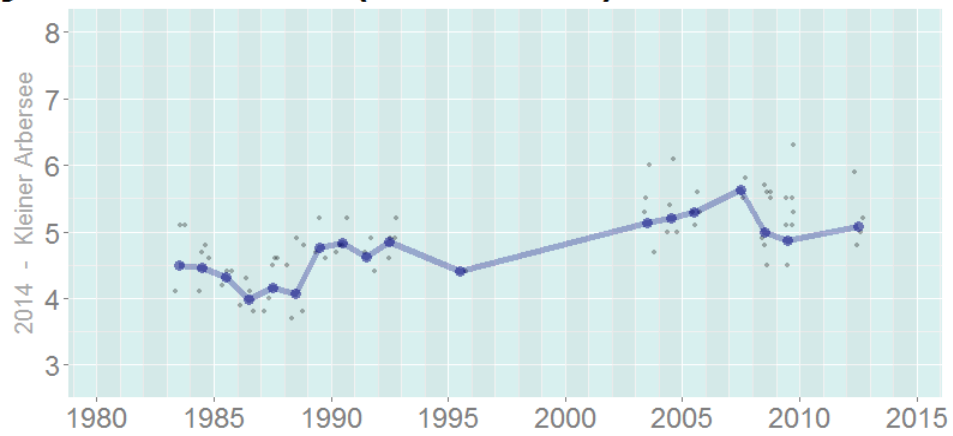
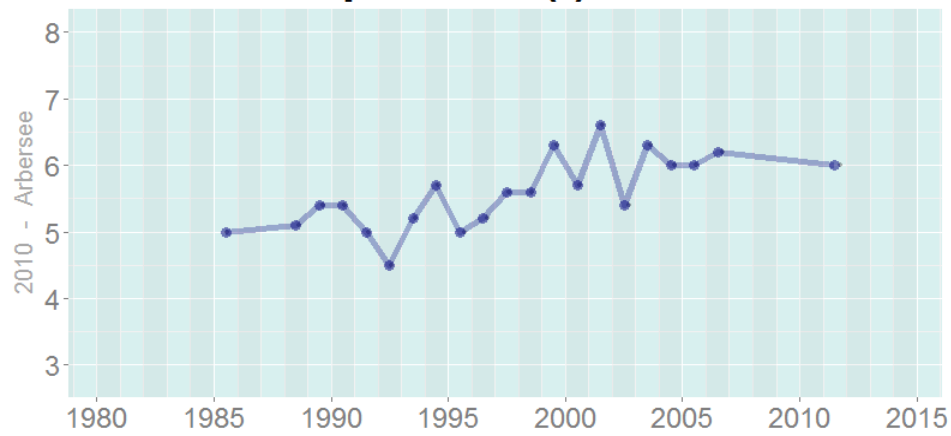
Fläche (ha): 6,36
Tiefe (m): 9
Höhe ü.NN (m): 918,4

Zulauf Seebach

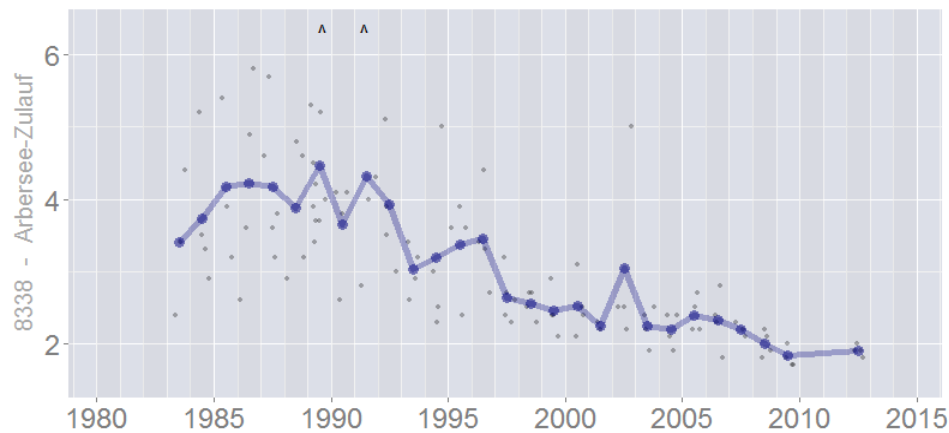
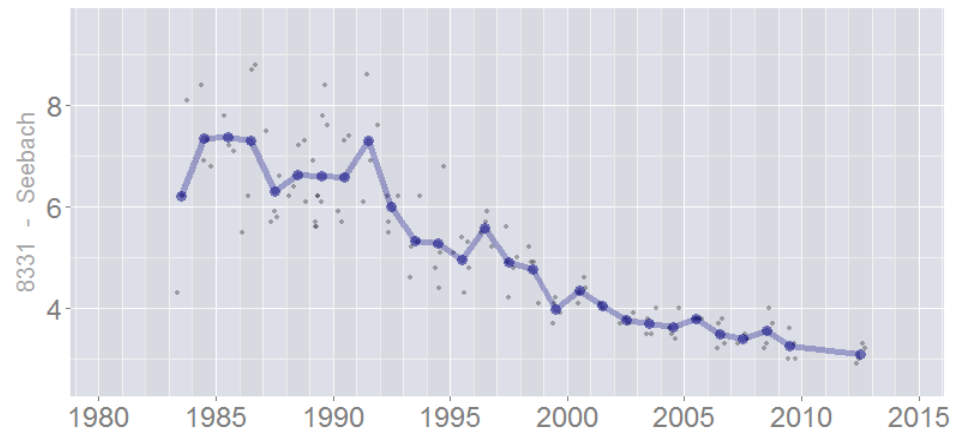
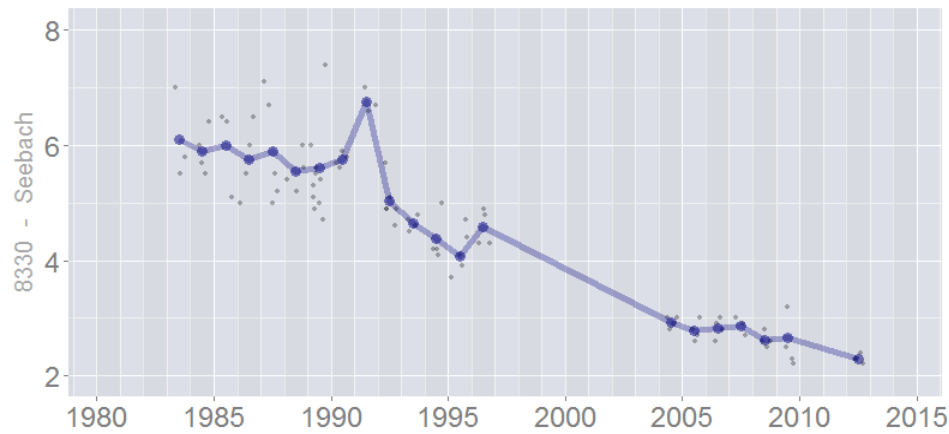
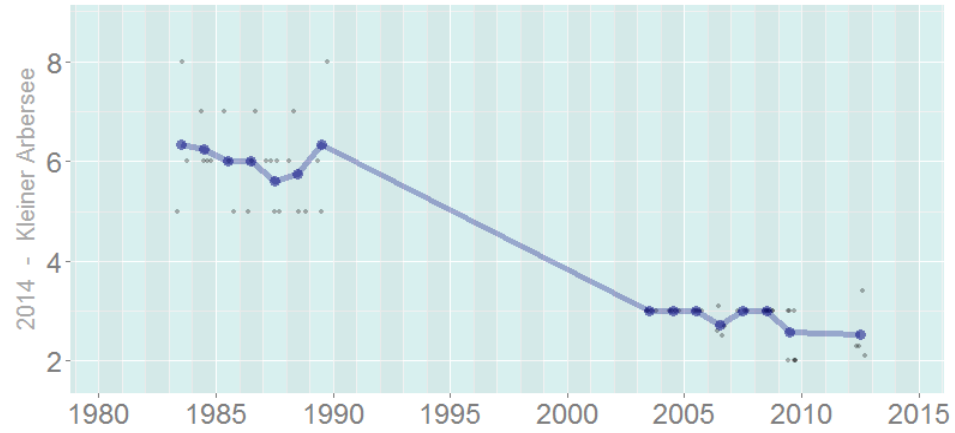
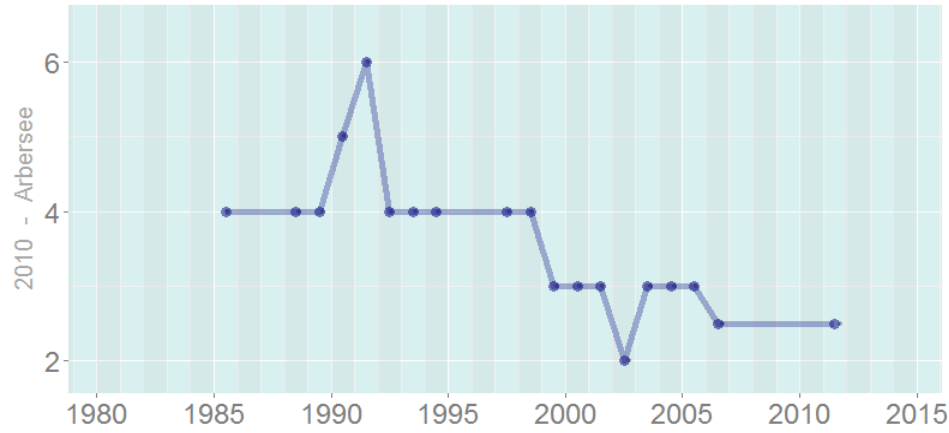


Zulauf li.

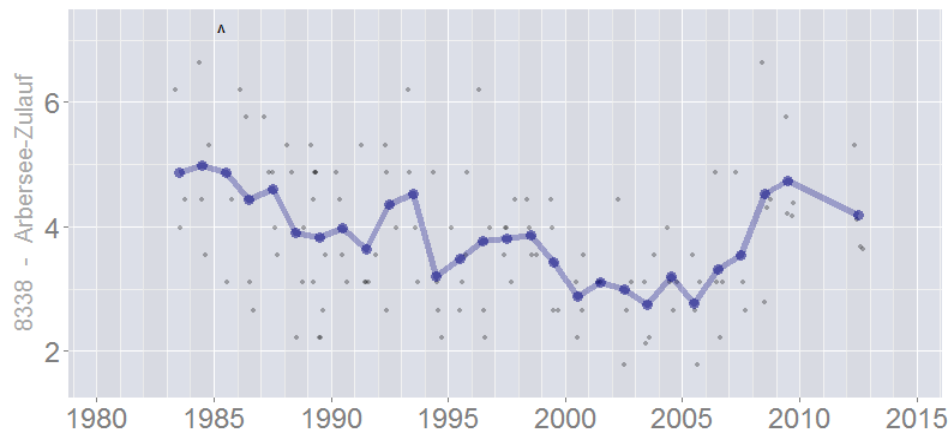
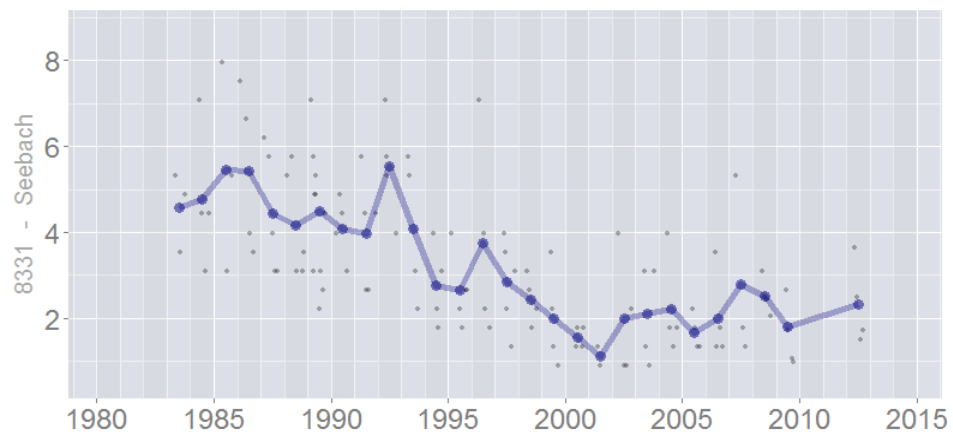
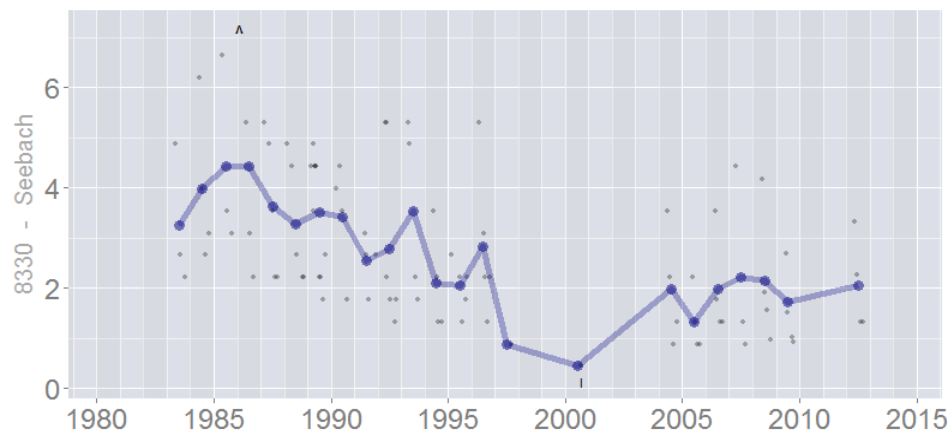
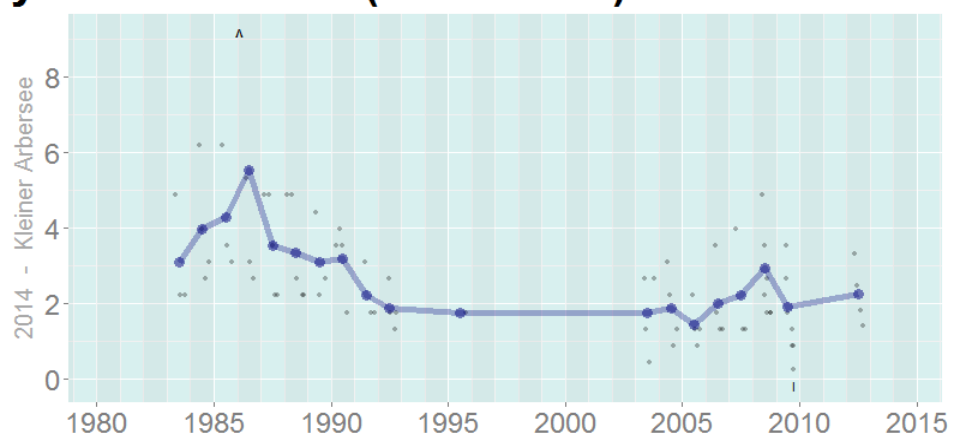
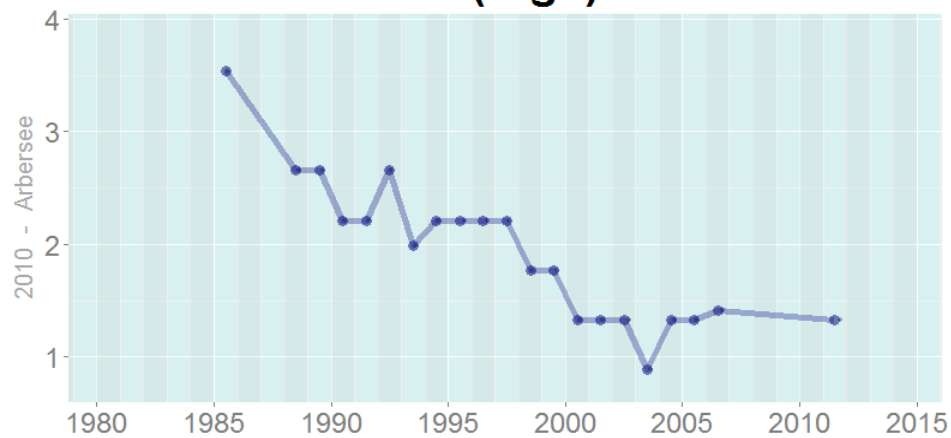
pH-Wert (-) - Gewässer - Bayerischer Wald (Arberseen)



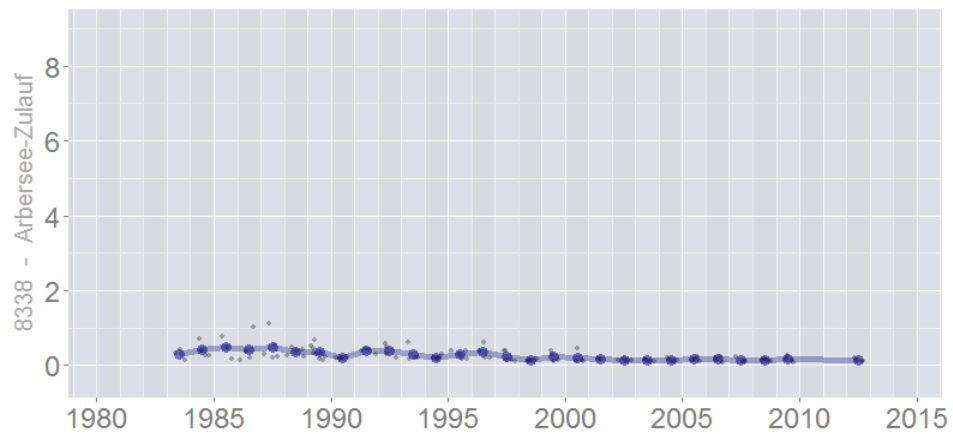
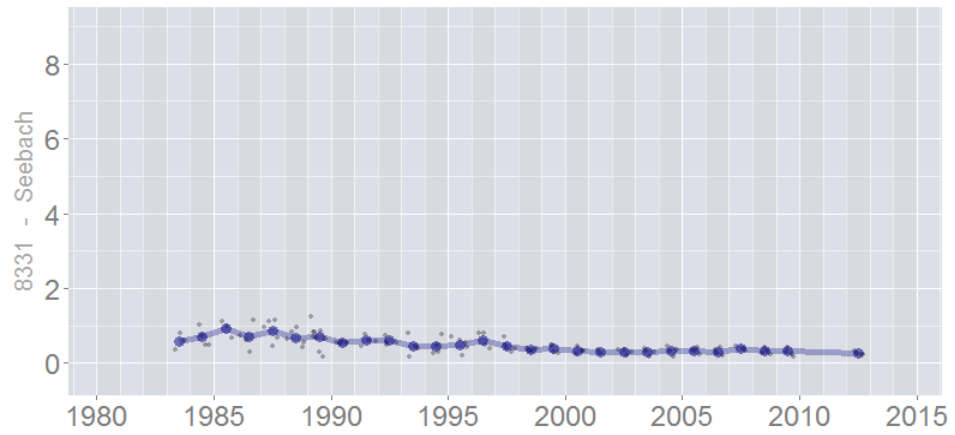
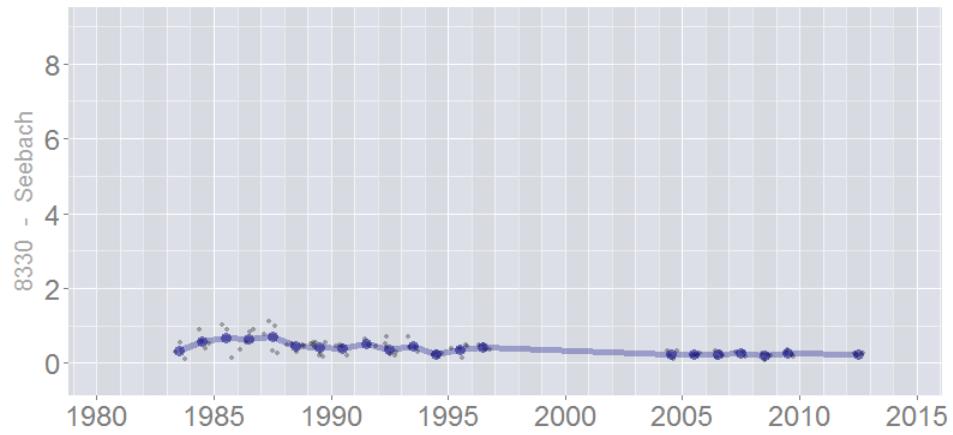
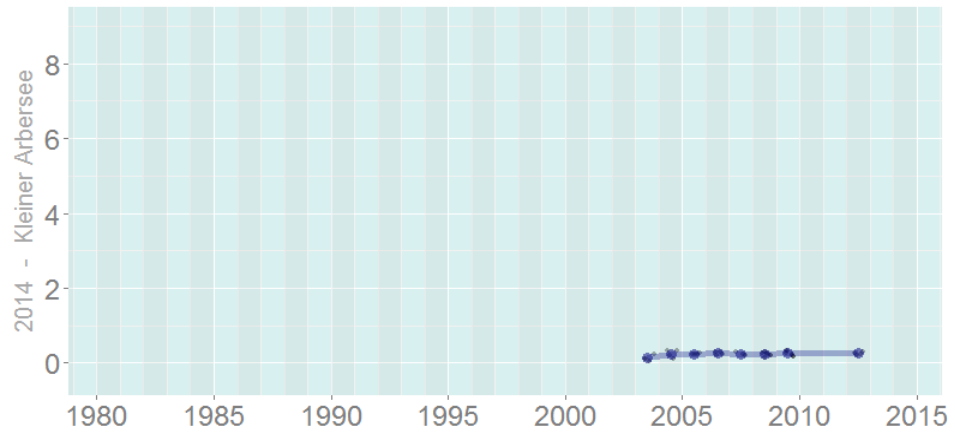
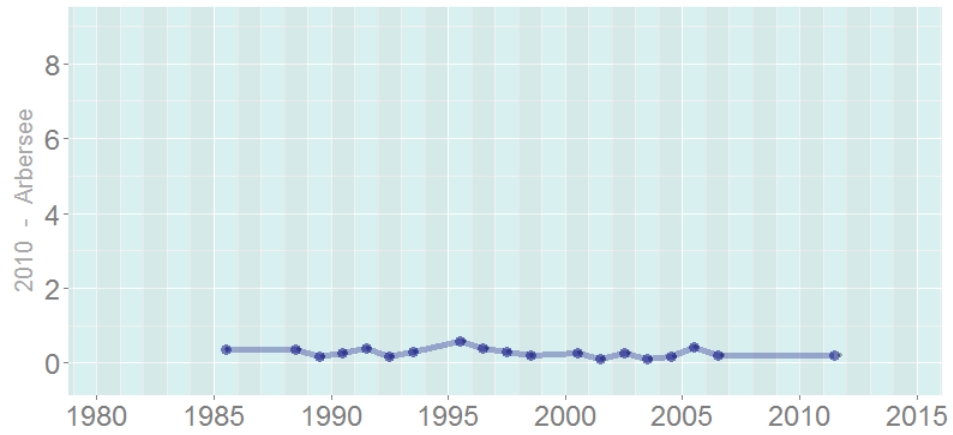
Sulfat (mg/l) - Gewässer - Bayerischer Wald (Arberseen)



Nitrat (mg/l) - Gewässer - Bayerischer Wald (Arberseen)



Aluminium (mg/l) - Gewässer - Bayerischer Wald (Arberseen)



Trinkwassertalsperre Frauenau



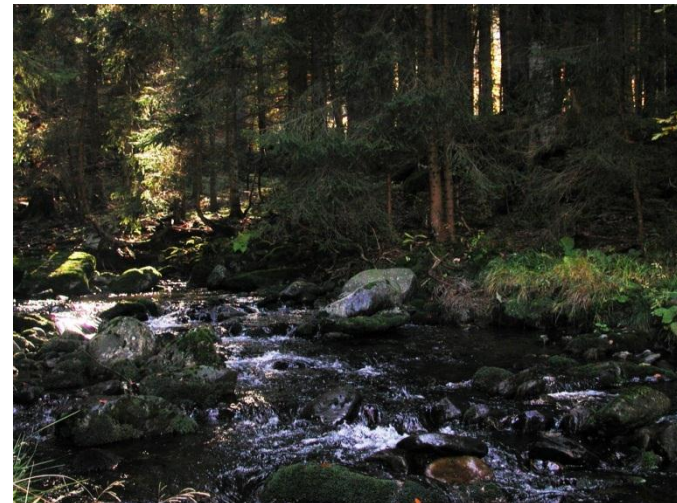
Fläche (ha): 94
Tiefe (m): 68
Höhe ü.NN (m): 767

Zulauf Hirschbach

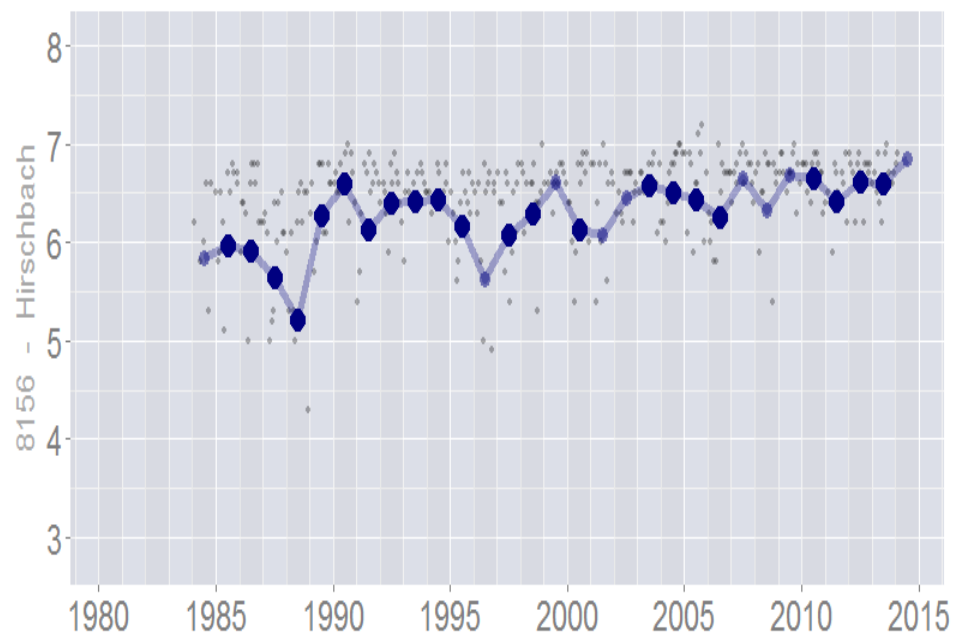
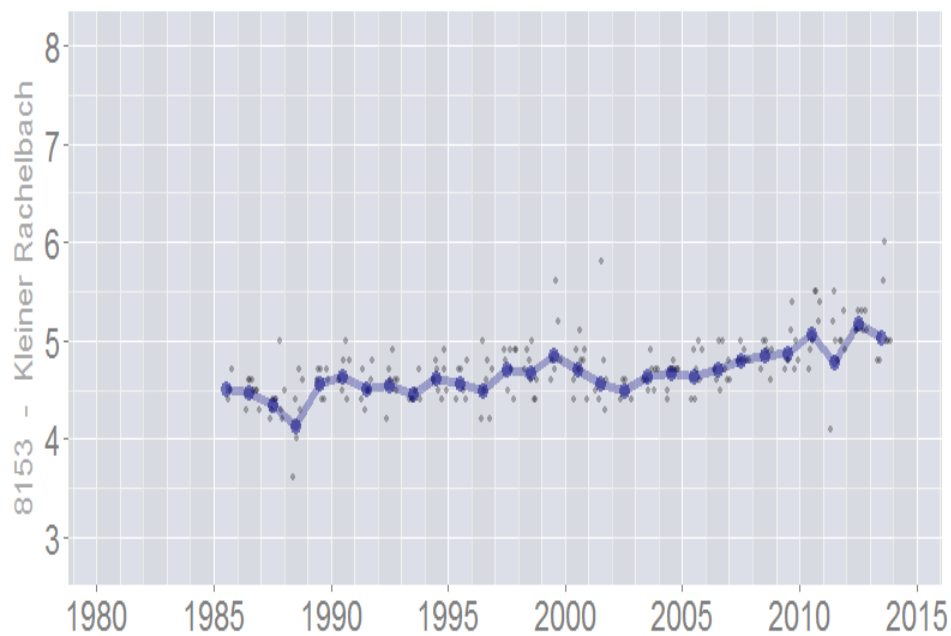
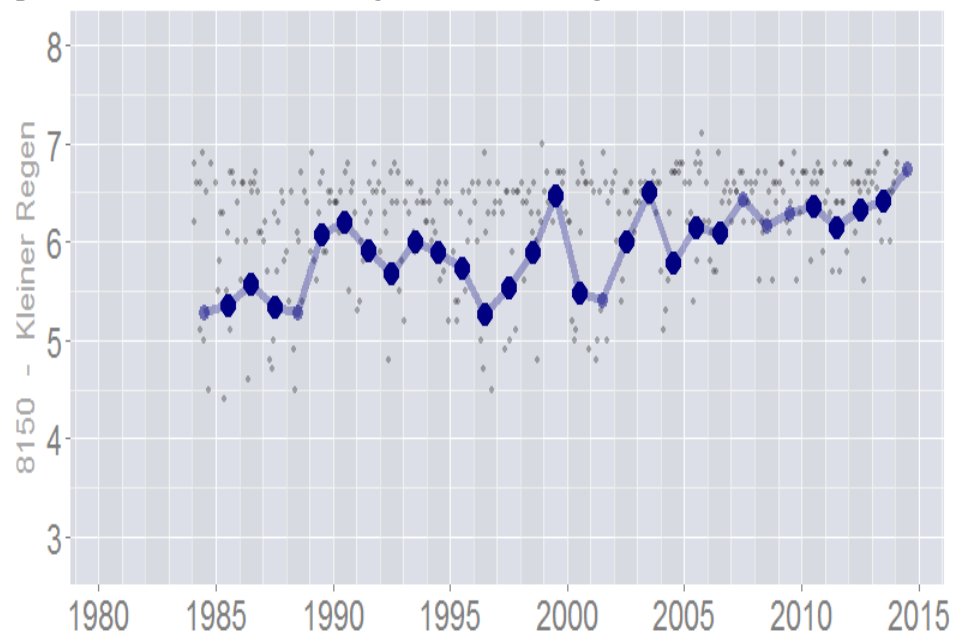
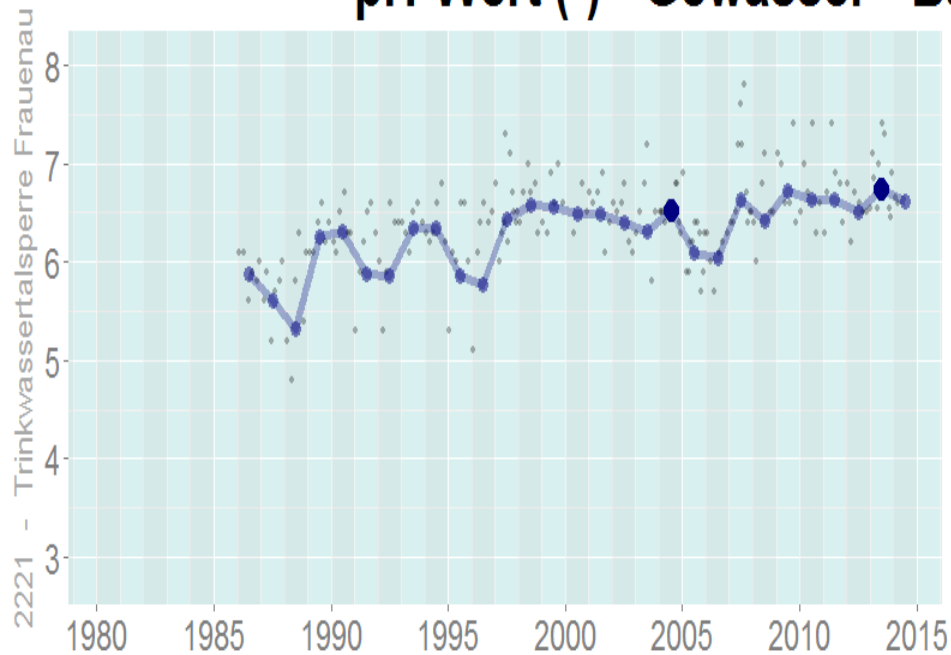
Zulauf Kl. Rachelbach



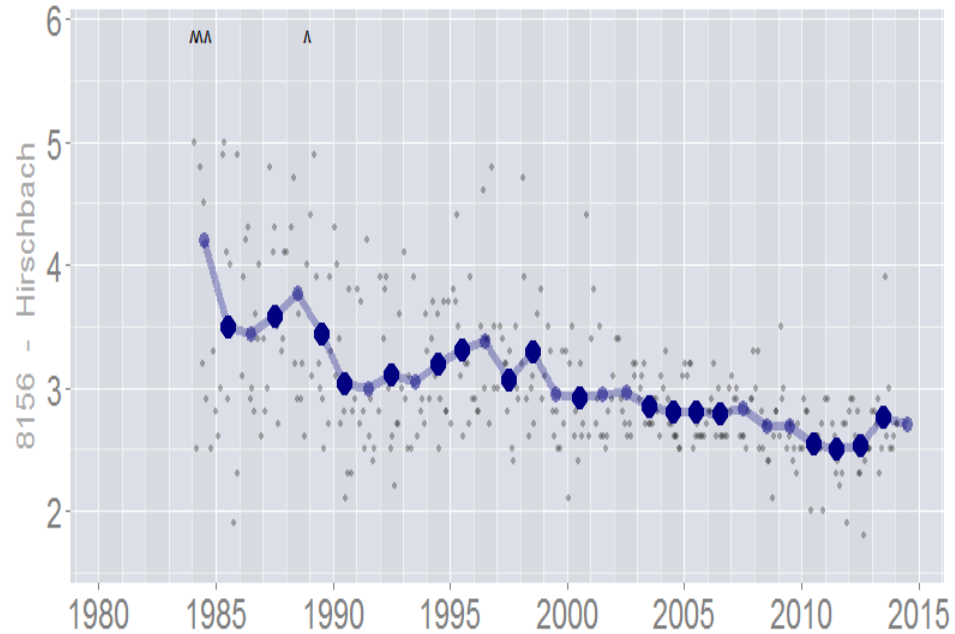
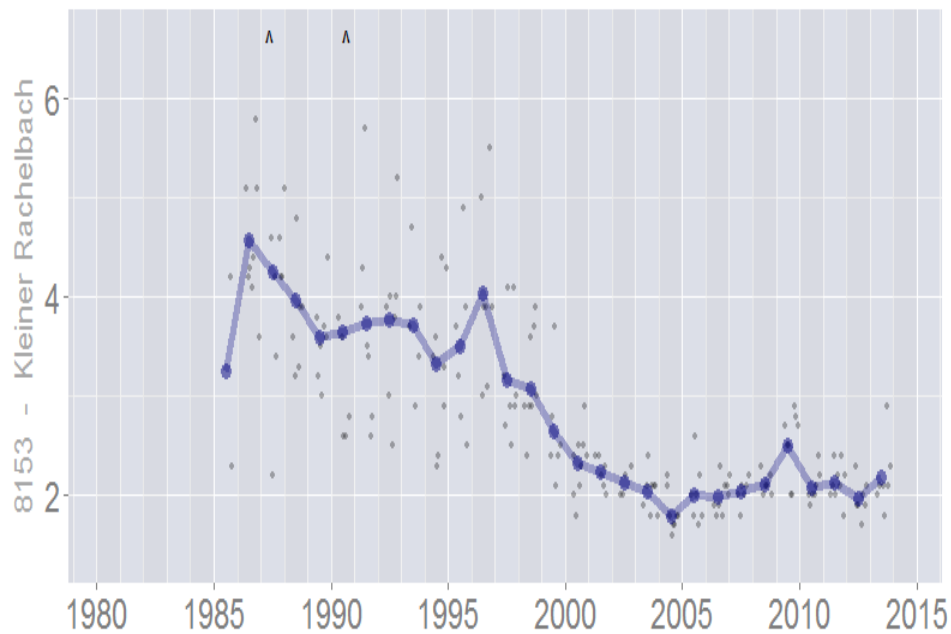
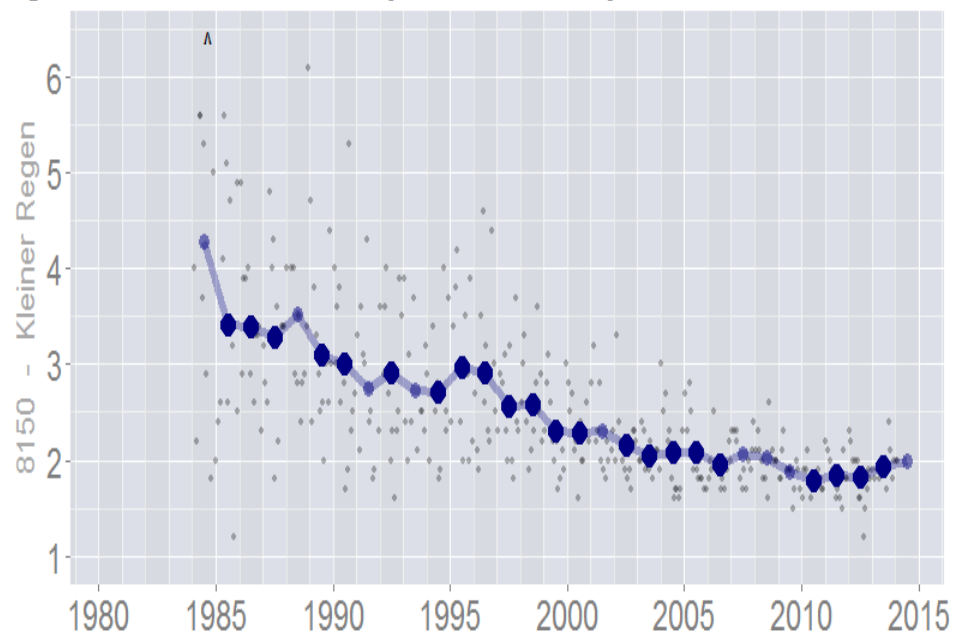
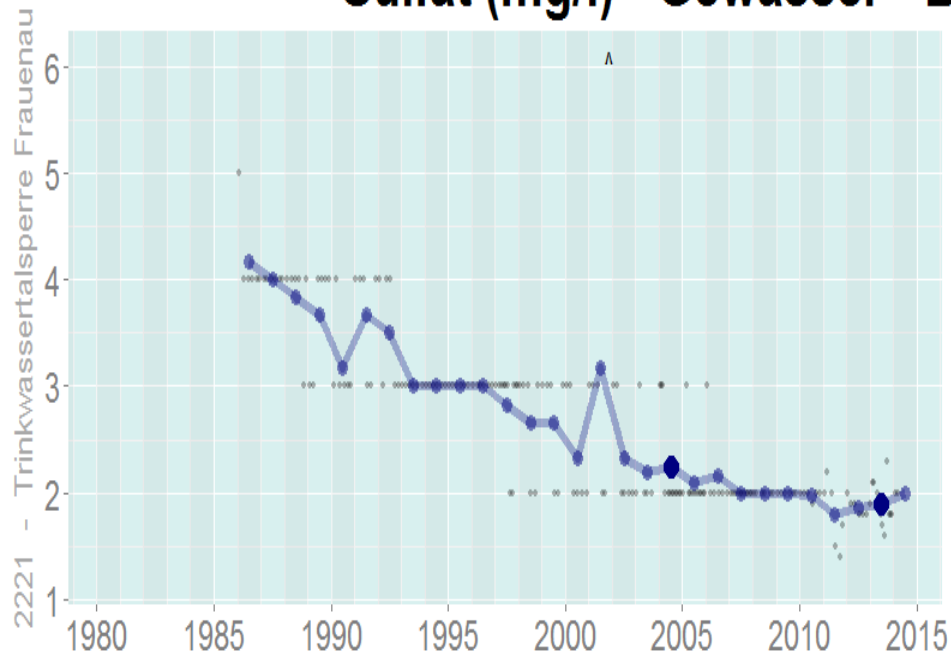
Zulauf Kl. Regen



pH-Wert (-) - Gewässer - Bayerischer Wald (Frauenau)

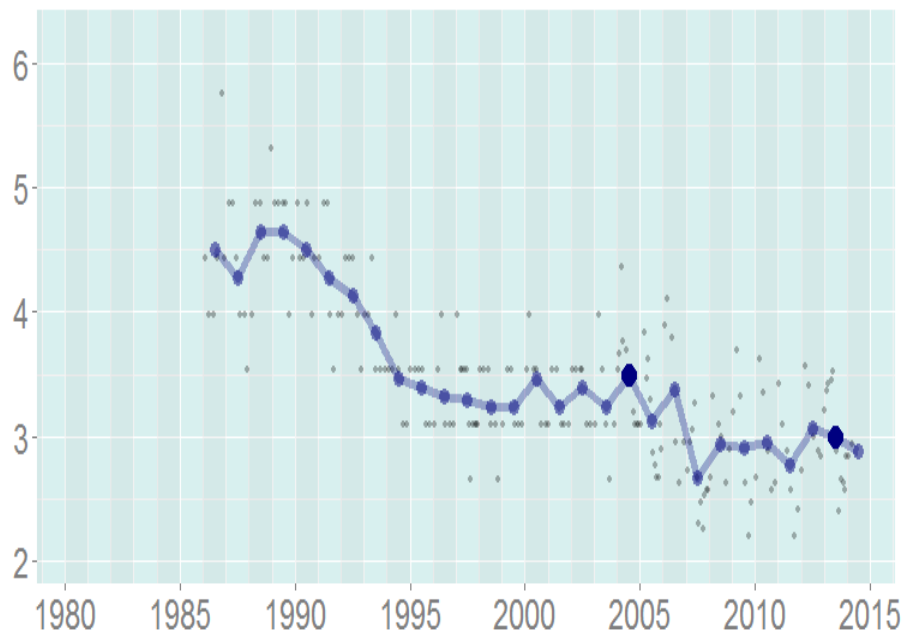


Sulfat (mg/l) - Gewässer - Bayerischer Wald (Frauenau)

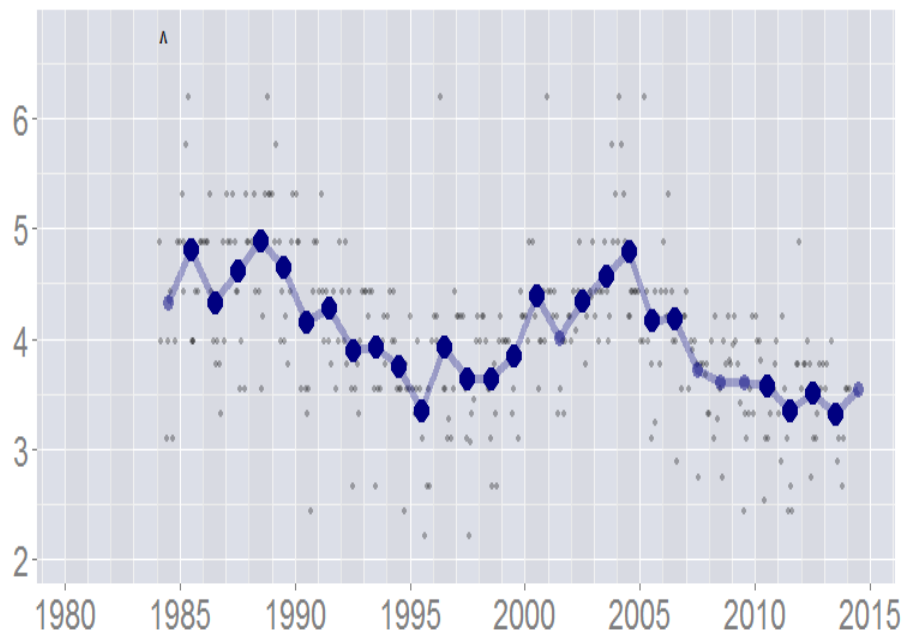


Nitrat (mg/l) - Gewässer - Bayerischer Wald (Frauenau)

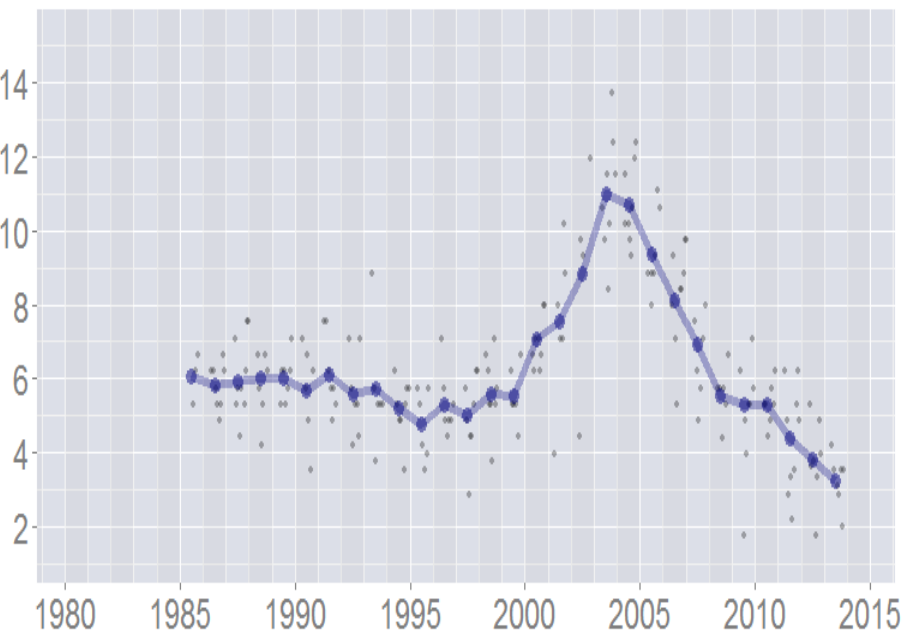
2221 - Trinkwassertalsperre Frauenau



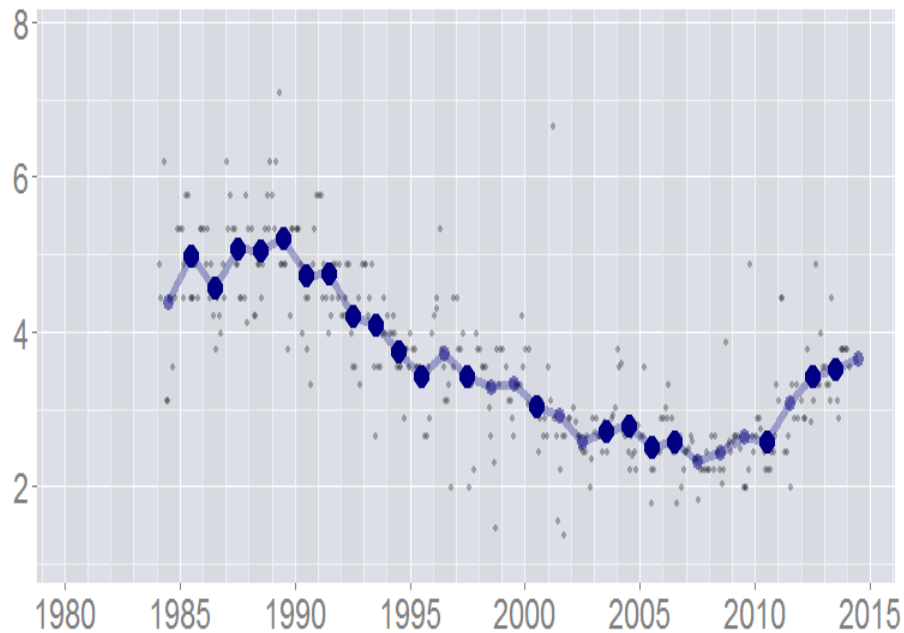
8150 - Kleiner Regen



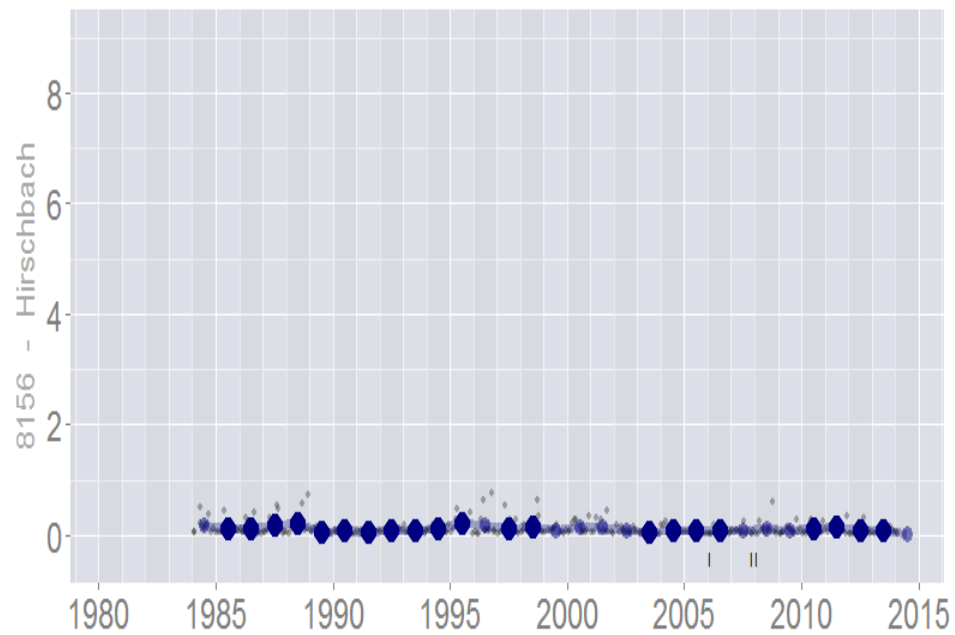
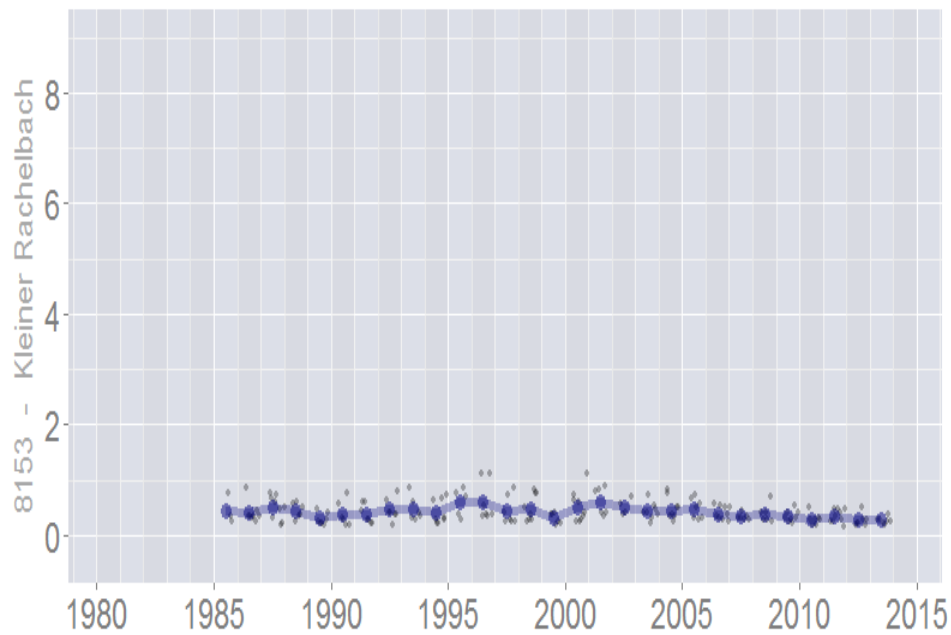
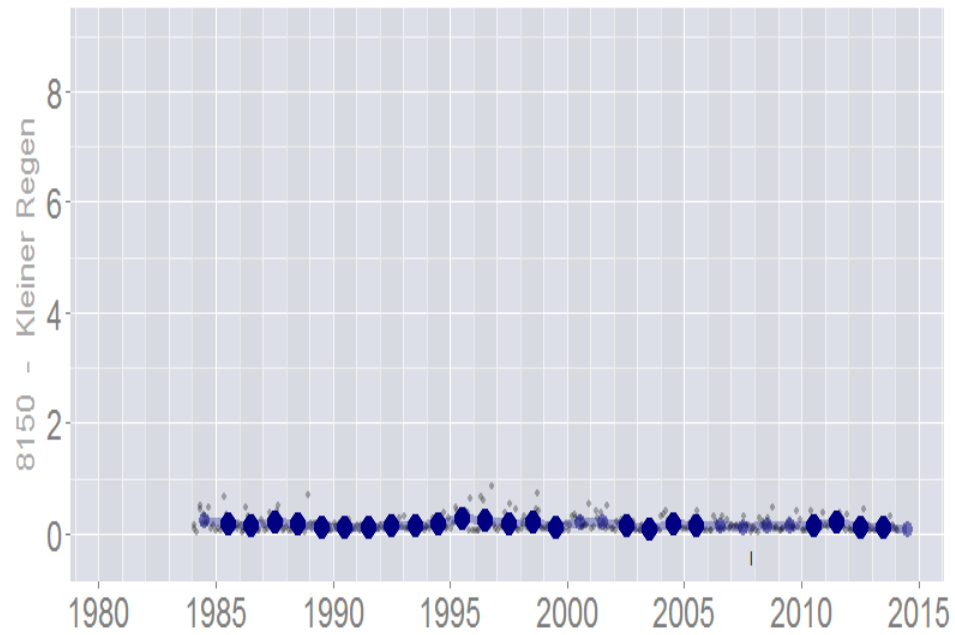
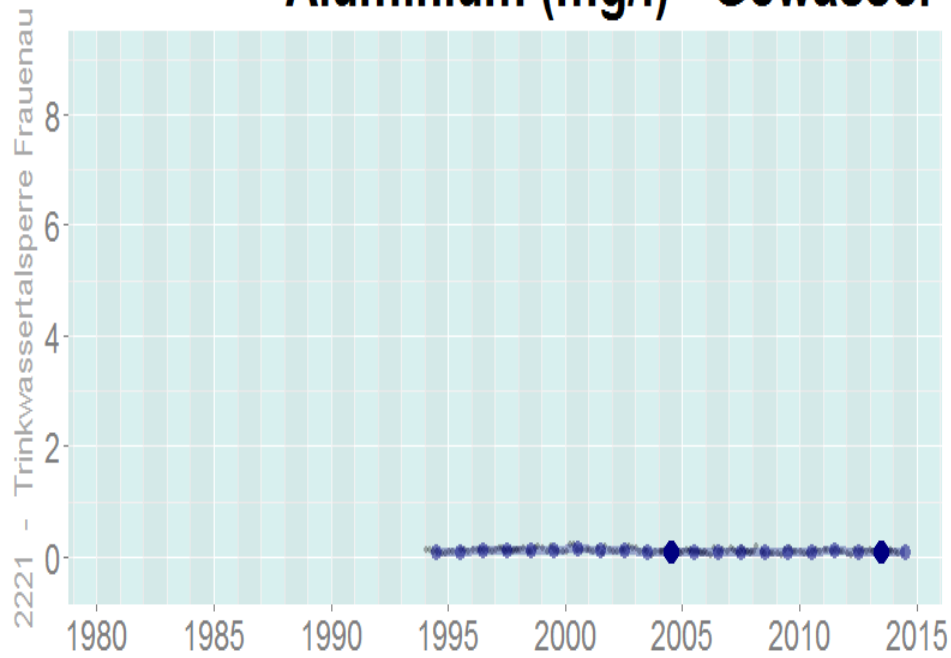
8153 - Kleiner Rachelbach



8156 - Hirschbach



Aluminium (mg/l) - Gewässer - Bayerischer Wald (Frauenau)



Versauerungsmonitoring Seen – Zusammenfassung, Ausblick

- Versauerungsparameter in Seezuläufen schlechter als in Seen
- Entspannung chemischer Parameter in Zuläufen und Seen sichtbar, mittlere pH-Werte aktuell bei natürlichen Seen ca. 6, bei TWT Frauenau ca. 7
- Zuläufe episodisch stärker sauer (Schneesmelze), Säureschübe in Seen weiterhin möglich
- Langfristige weitere Beobachtung der Entwicklung in Seen und Zuflüssen wichtig
- Auswirkungen von chemischer Entwicklung auf die Gewässerökologie soll gezielter erfasst werden
- Neue Messprogramme mit ausgewählten Parametern und Biokomponenten an Seen mit Zuflüssen werden erarbeitet
- Beim Monitoring Qualität vor Quantität, d.h. Untersuchung weniger Gewässer in größeren Zeitabständen (z.B. 5 Jahre), aber dann mit hoher Frequenz (z.B. monatlich)



Vielen Dank für Ihre
Aufmerksamkeit !