



Professioneel persleidingenbeheer:
Degradatie van asbestcementen
afvalwaterpersleidingen - bijlagen

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Degradatie van asbestcementen afvalwaterpersleidingen **bijlagen**

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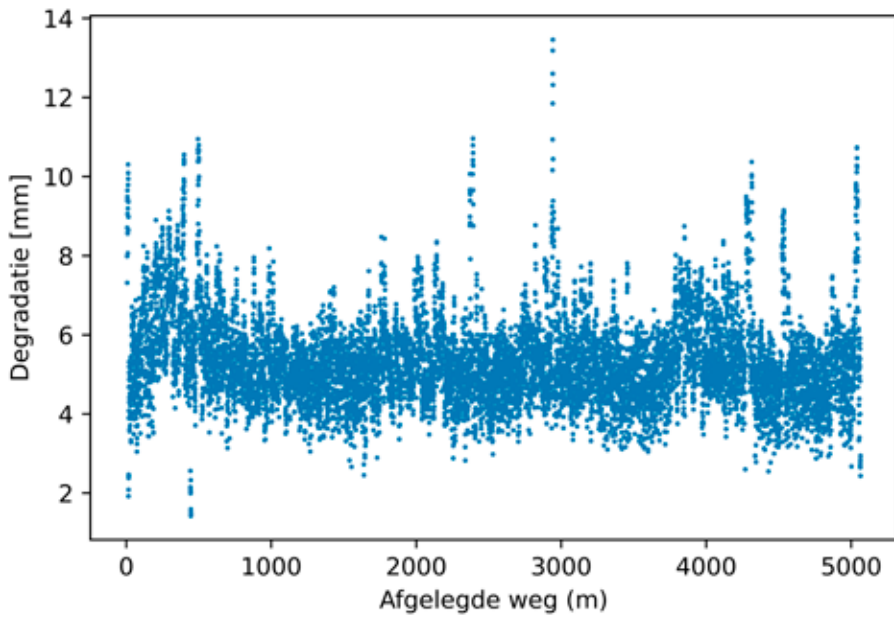
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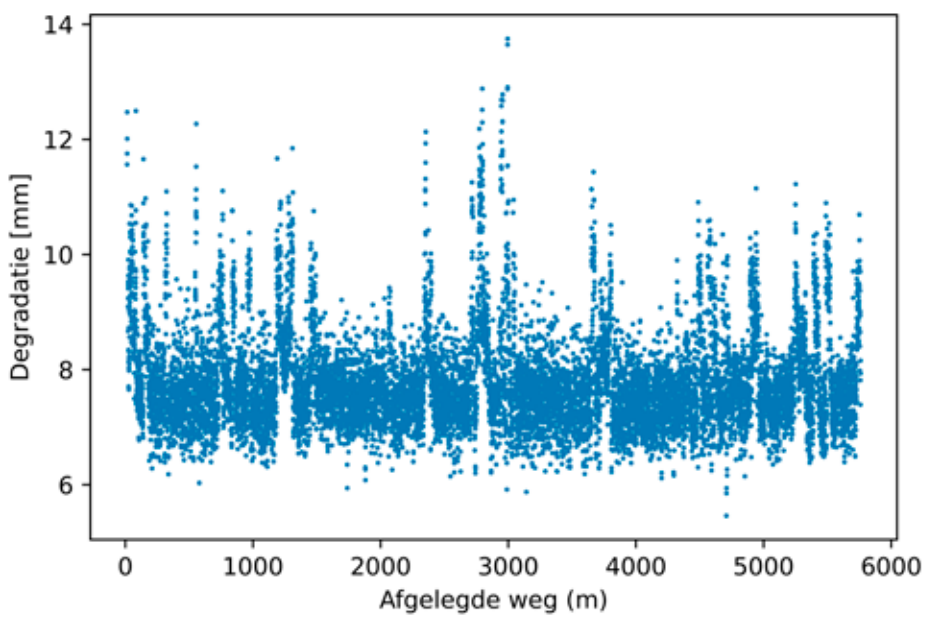
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Bijlage 1 – Gemiddelde degradatieprofiel dataset III

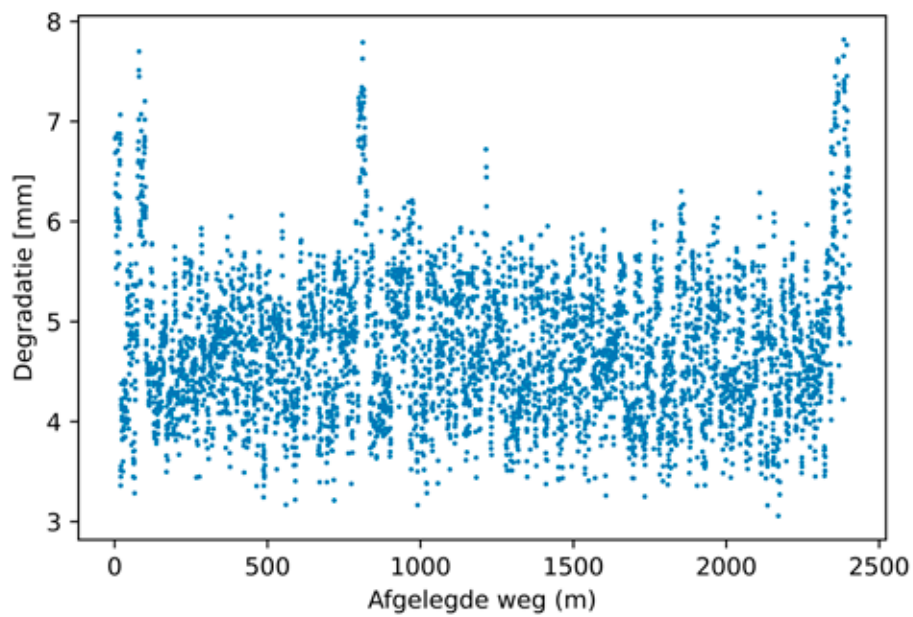
Gemiddelde uitloging Aa en Maas P19-006



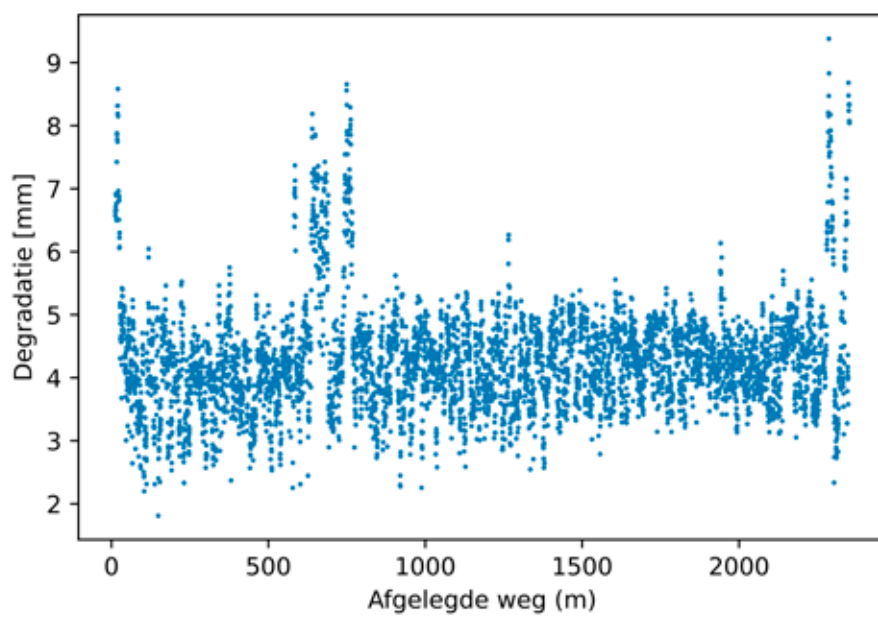
Gemiddelde uitloging Aa en Maas P19-007



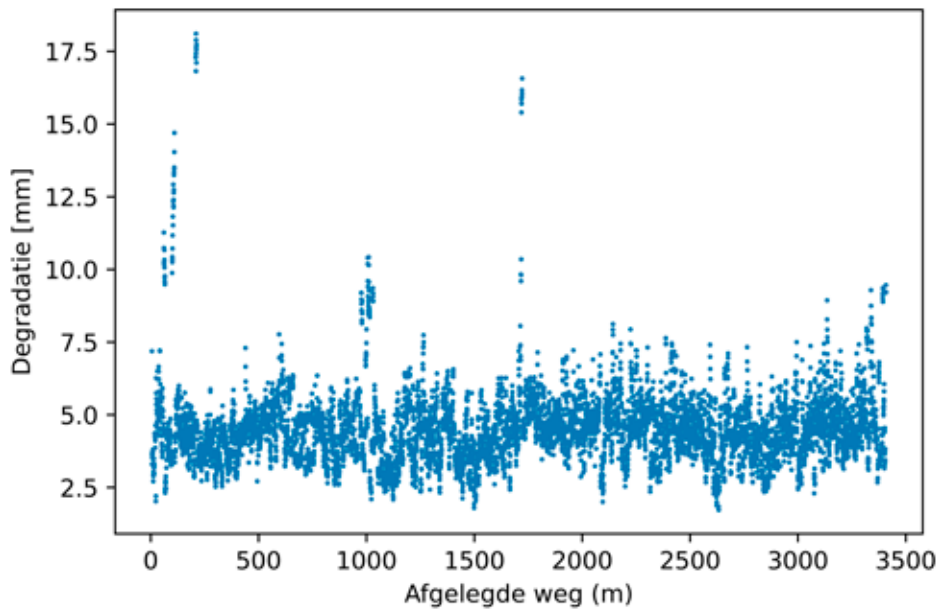
Gemiddelde uitloging Aa en Maas P19-028



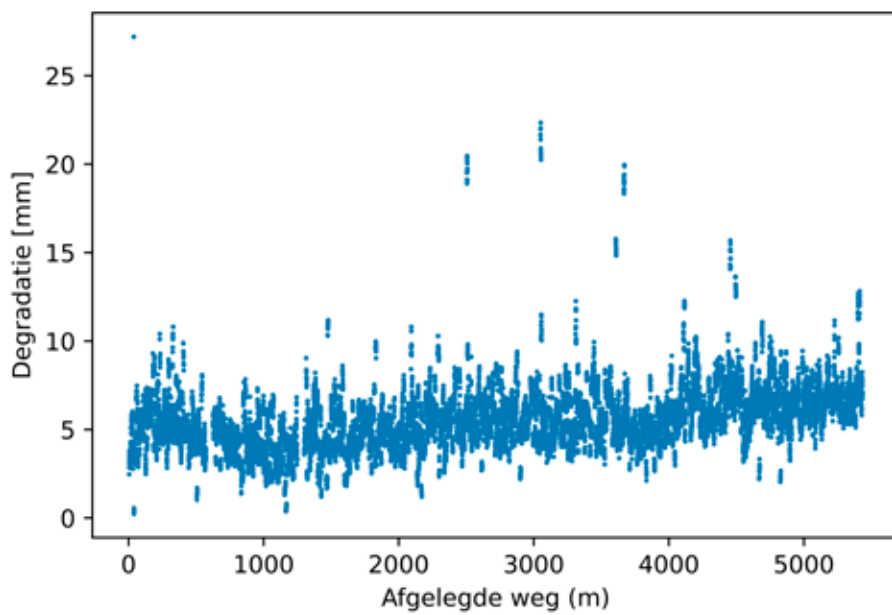
Gemiddelde uitloging Aa en Maas P19-029



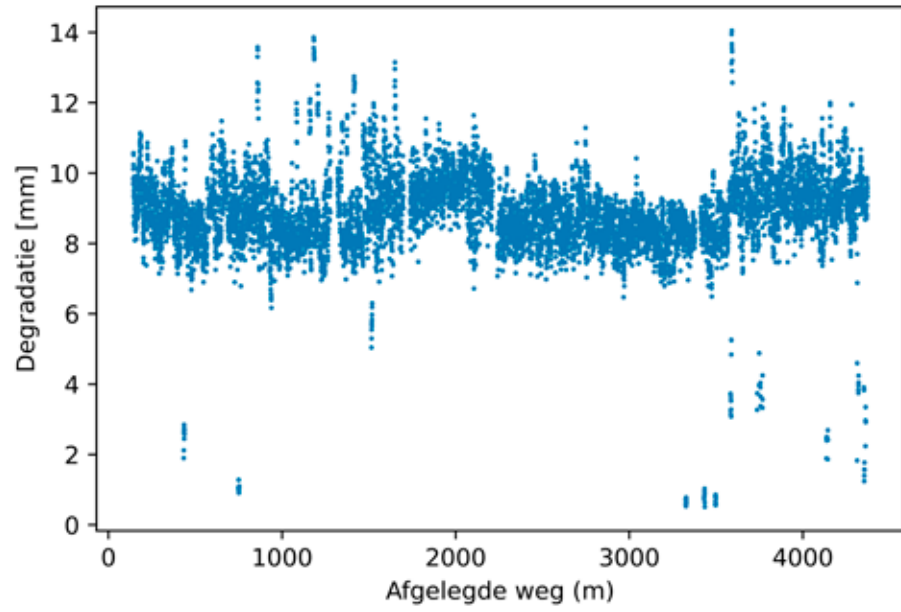
Gemiddelde uitloging Aa en Maas P20-011



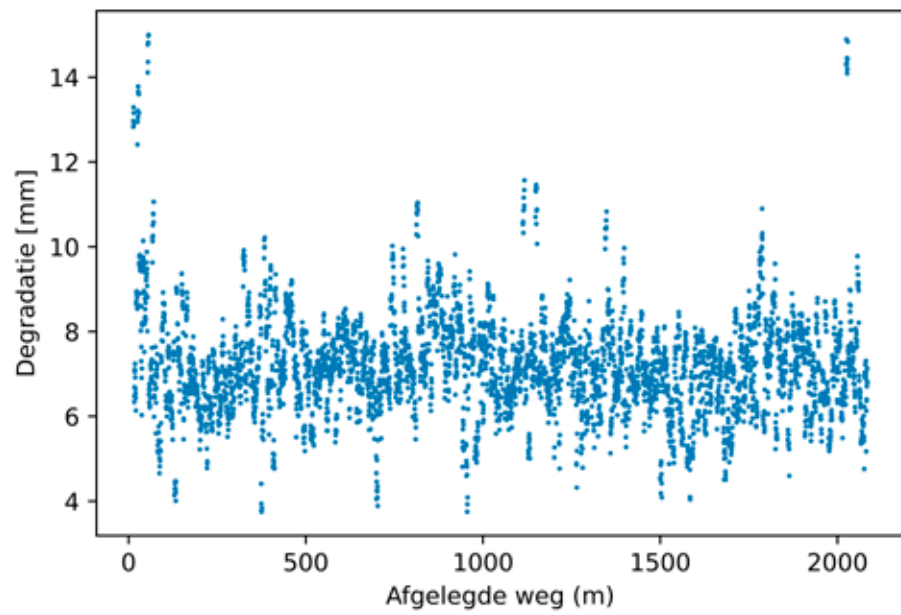
Gemiddelde uitloging Aa en Maas P20-012



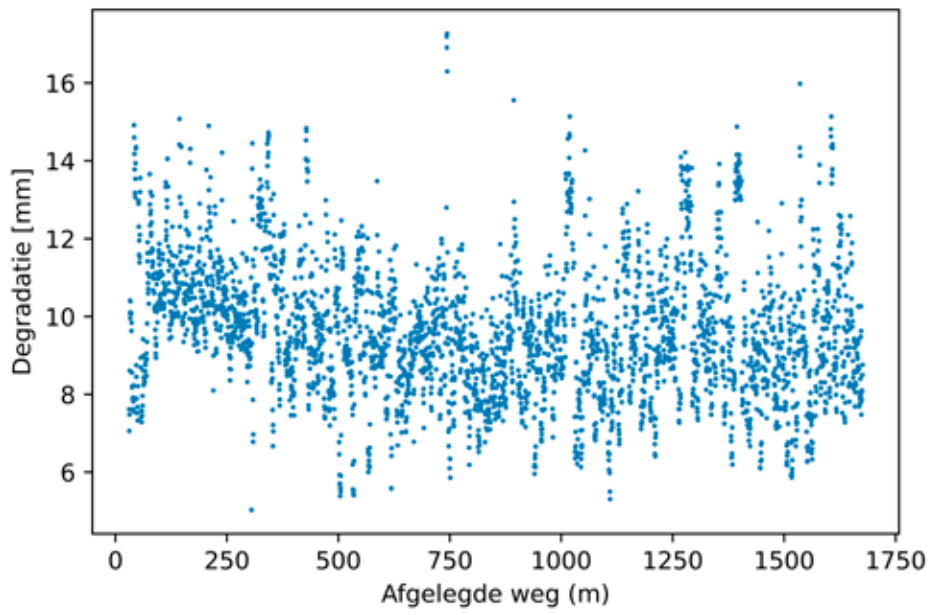
Gemiddelde uitloging Aa en Maas P20-019



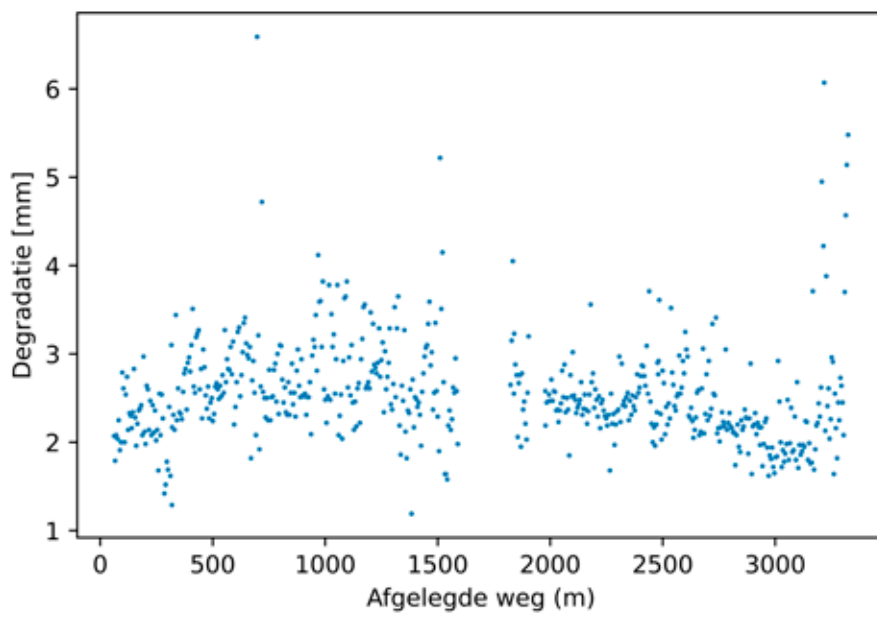
Gemiddelde uitloging Aa en Maas P21-004



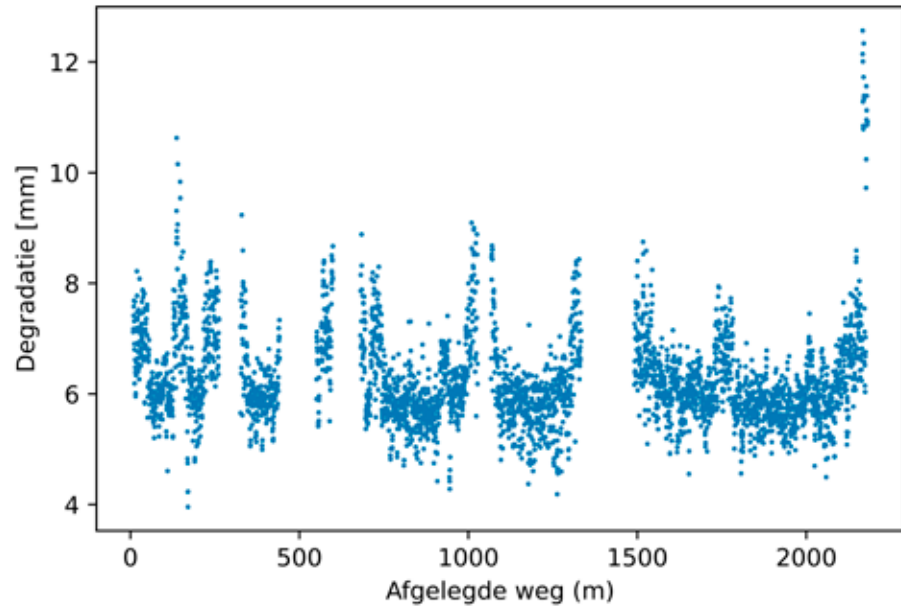
Gemiddelde uitlogging Brabantse Delta P20-010



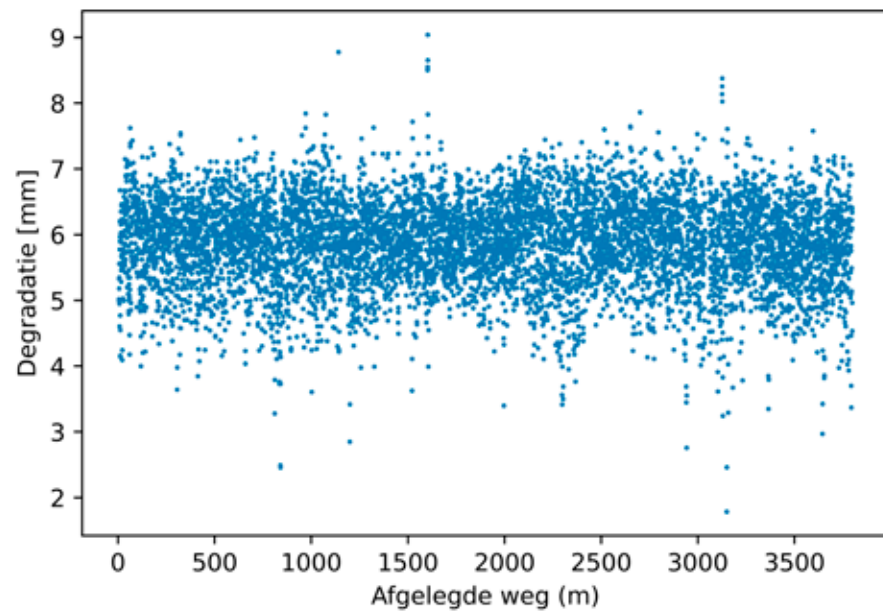
Gemiddelde uitlogging Brabantse Delta P21-015



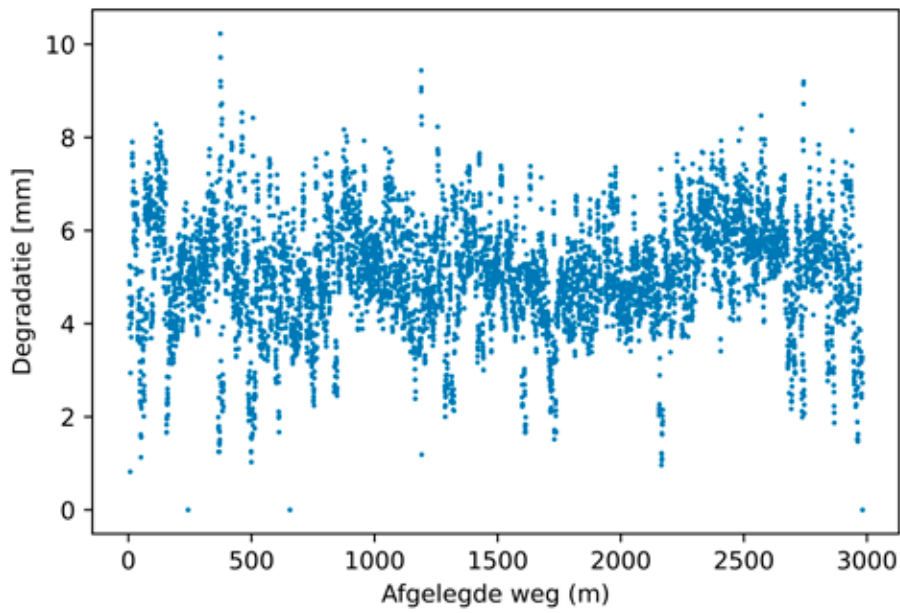
Gemiddelde uitloging Drents Overijsselse Delta P19-004



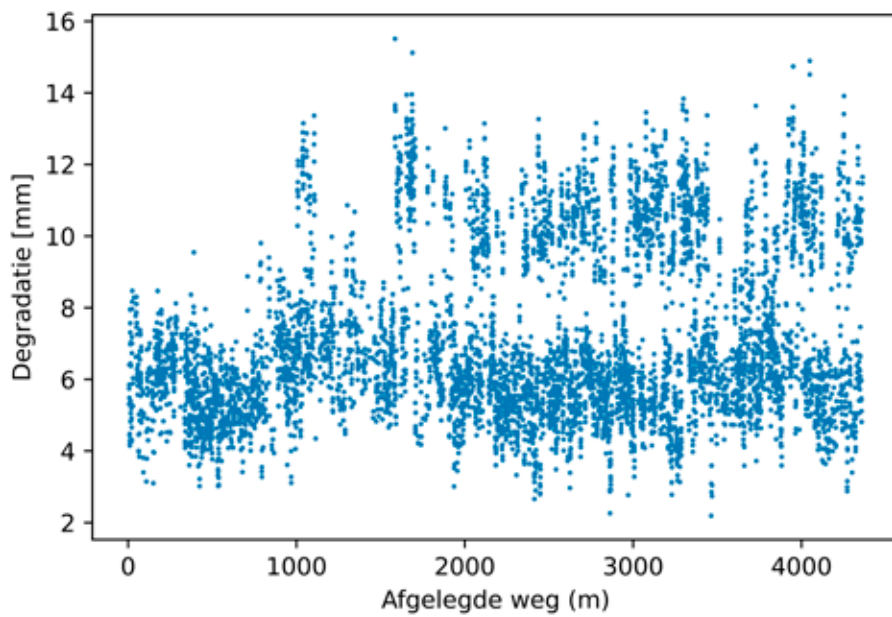
Gemiddelde uitloging Drents Overijsselse Delta P19-018



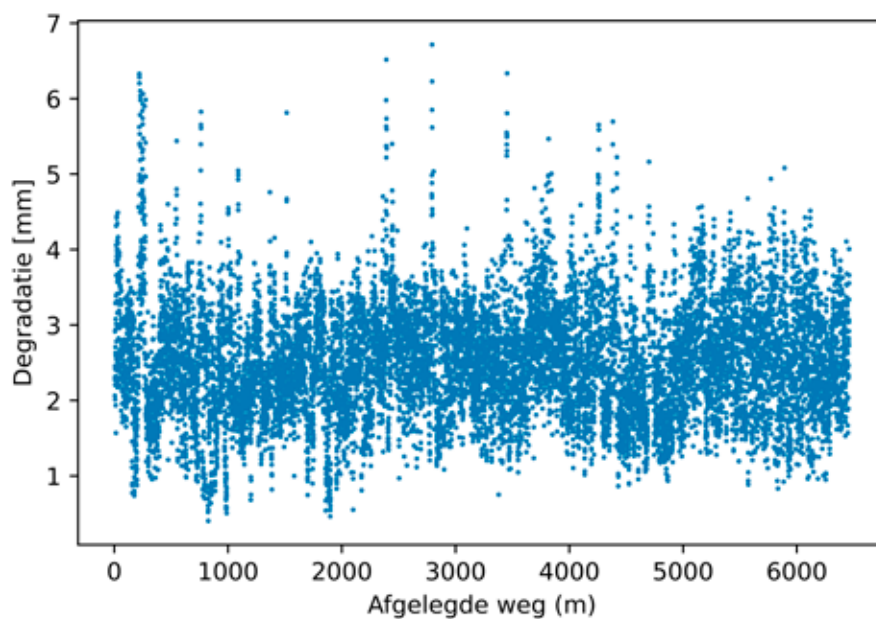
Gemiddelde uitloging Drents Overijsselse Delta P21-010



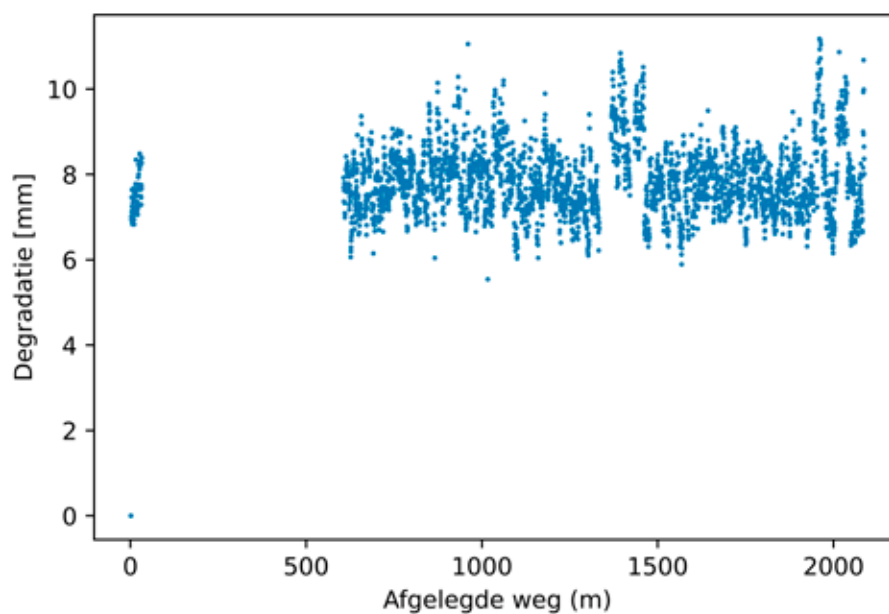
Gemiddelde uitloging Limburg P17-003



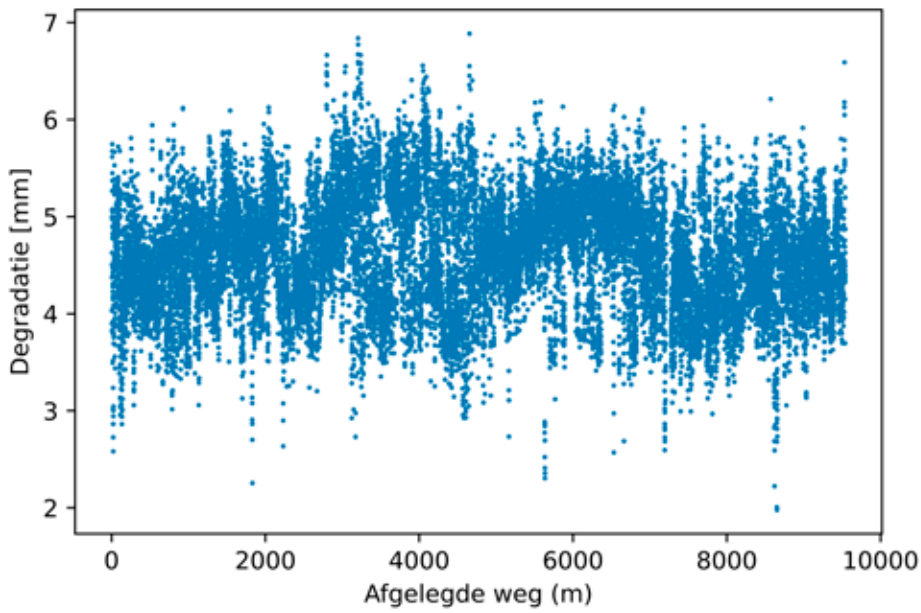
Gemiddelde uitloging Limburg P19-017



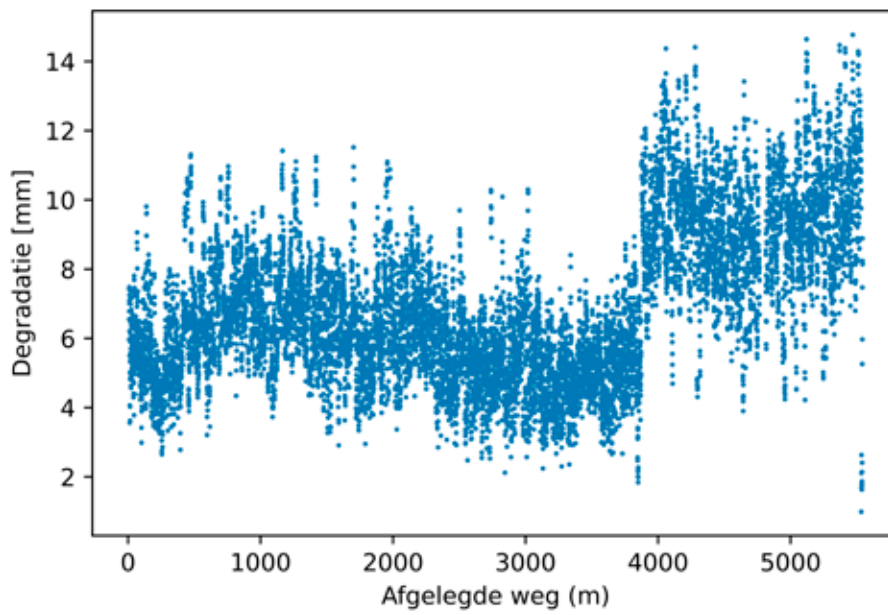
Gemiddelde uitloging Limburg P19-022



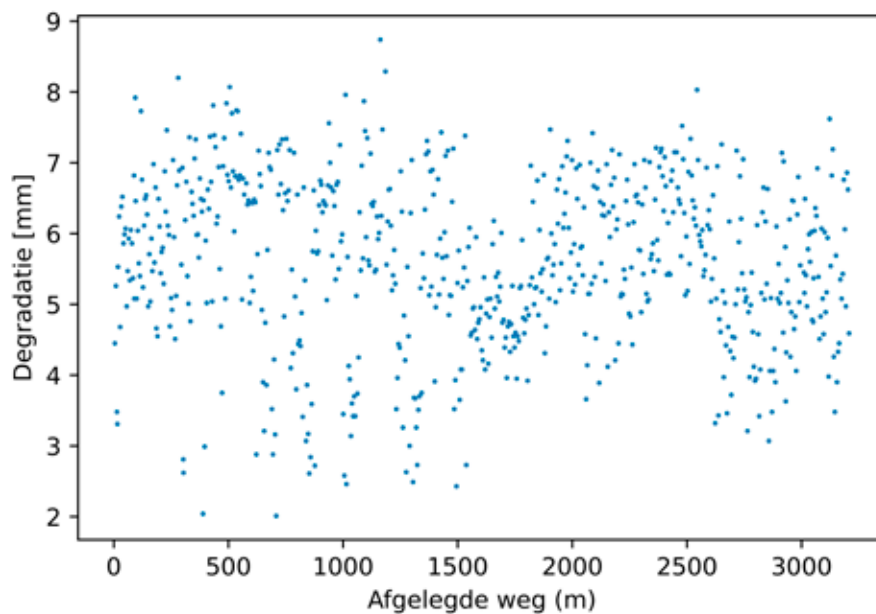
Gemiddelde uitloging Rijn en IJssel P19-019



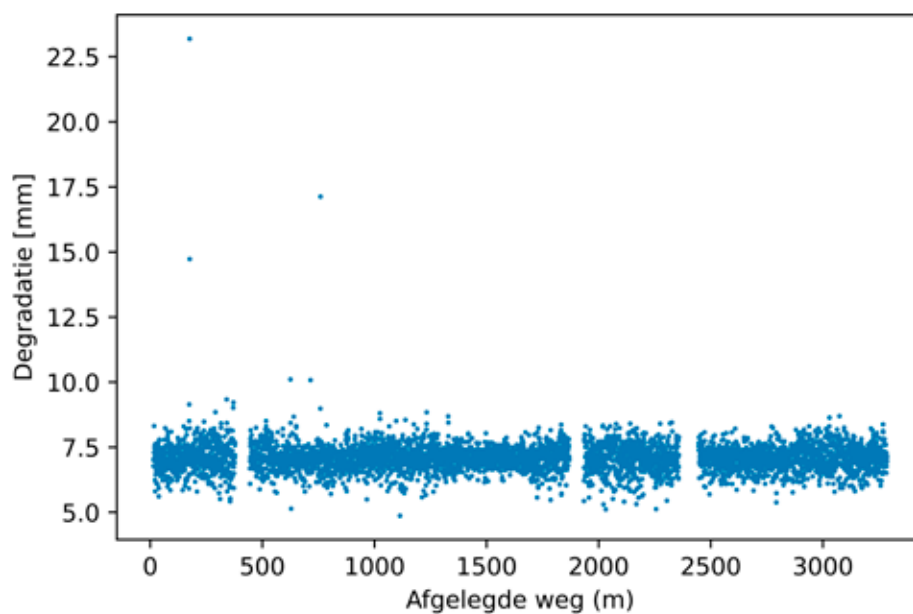
Gemiddelde uitloging Vallei en Veluwe P20-030



Gemiddelde uitloging Vallei en Veluwe P21-028

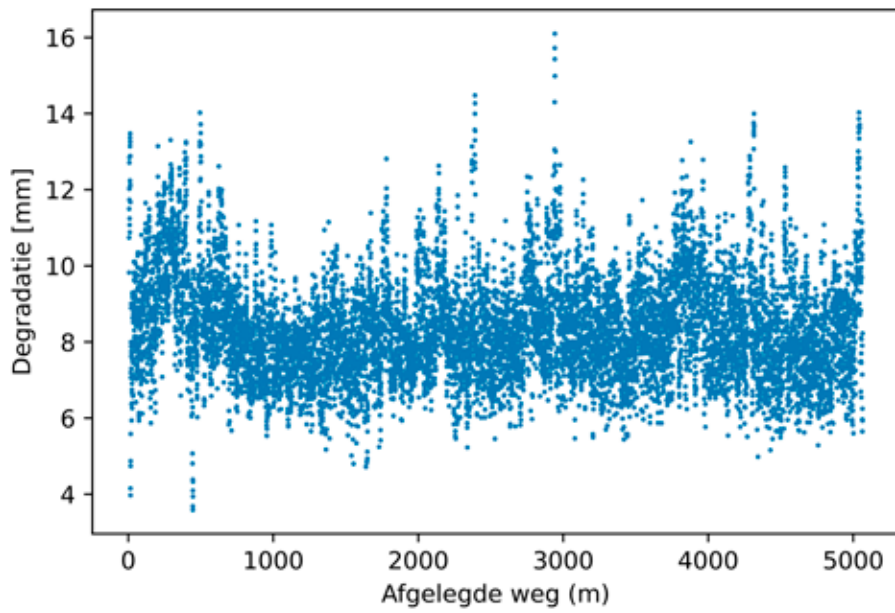


Gemiddelde uitloging Zuiderzeeland P18-018

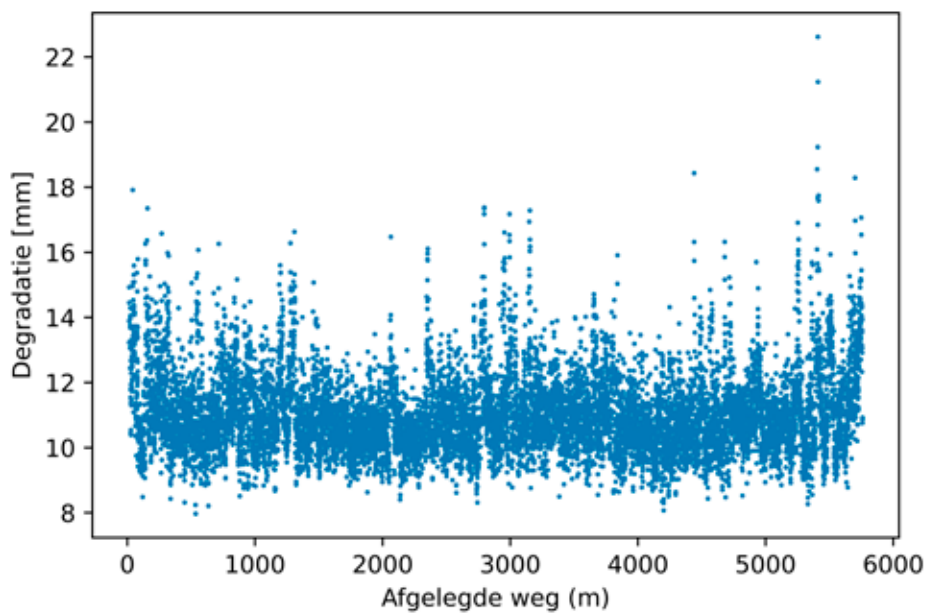


Bijlage 2 – Maximale degradatieprofiel dataset III

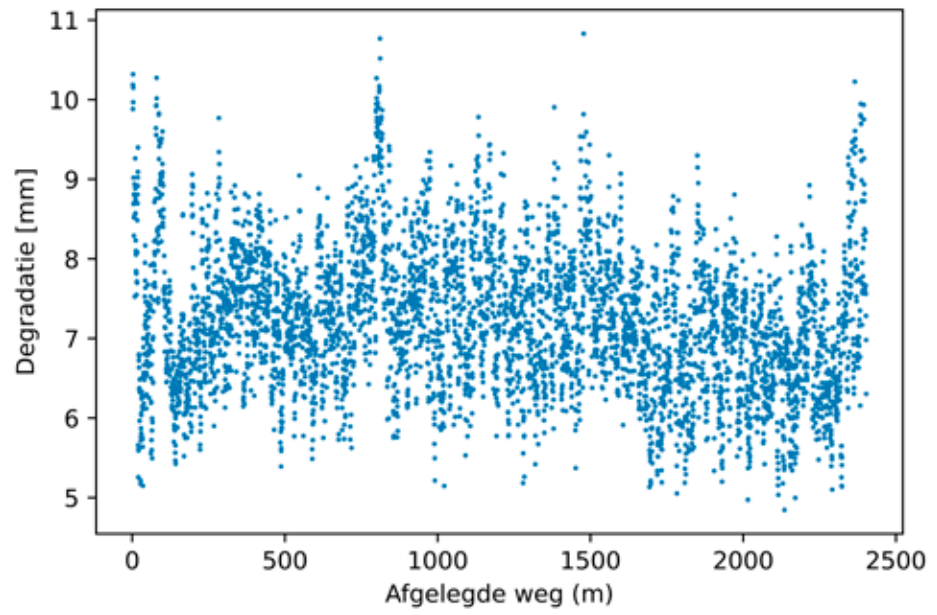
Maximale uitloging Aa en Maas P19-006



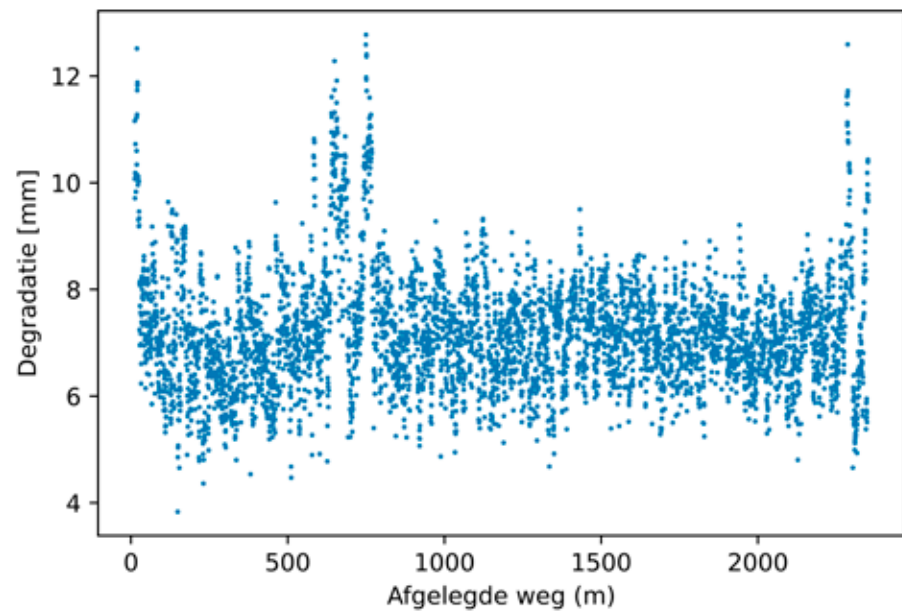
Maximale uitloging Aa en Maas P19-007



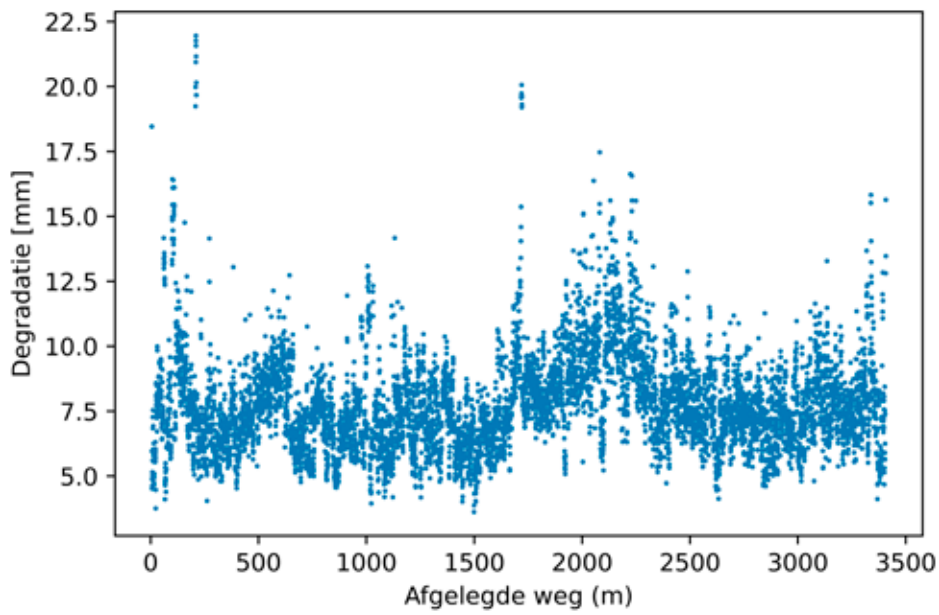
Maximale uitloging Aa en Maas P19-028



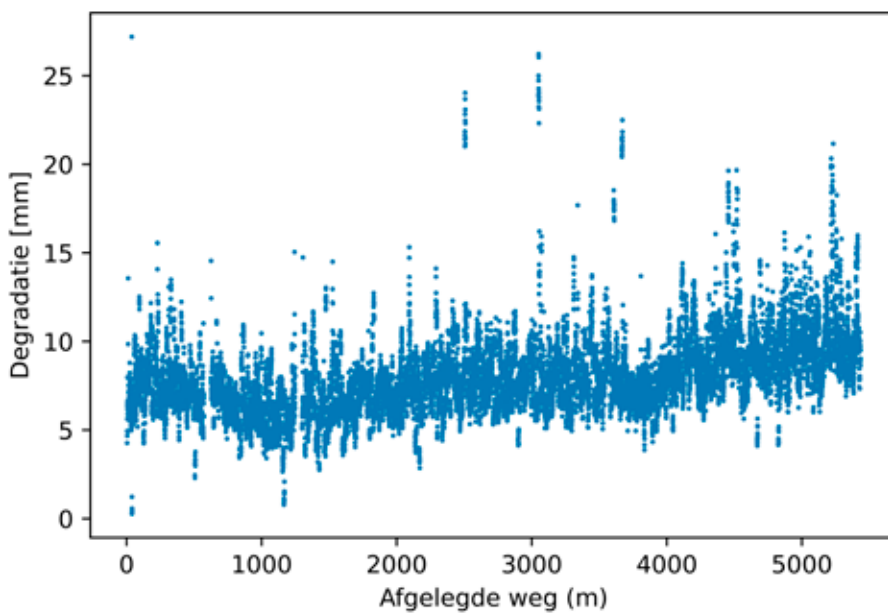
Maximale uitloging Aa en Maas P19-029



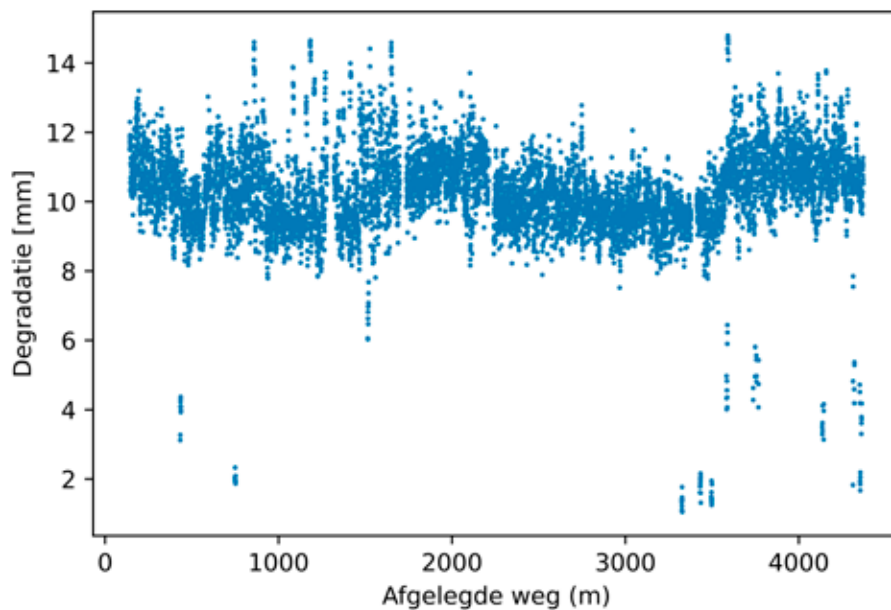
Maximale uitloging Aa en Maas P20-011



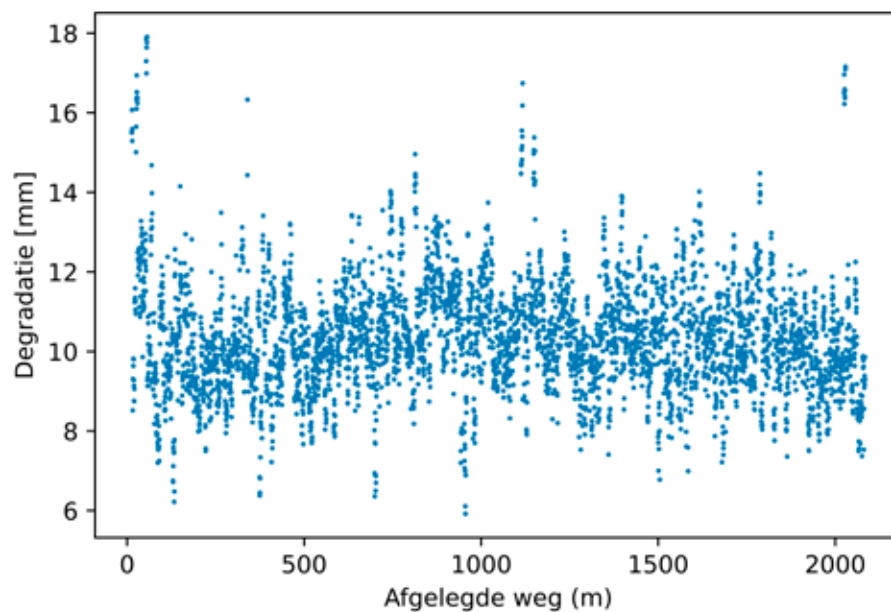
Maximale uitloging Aa en Maas P20-012



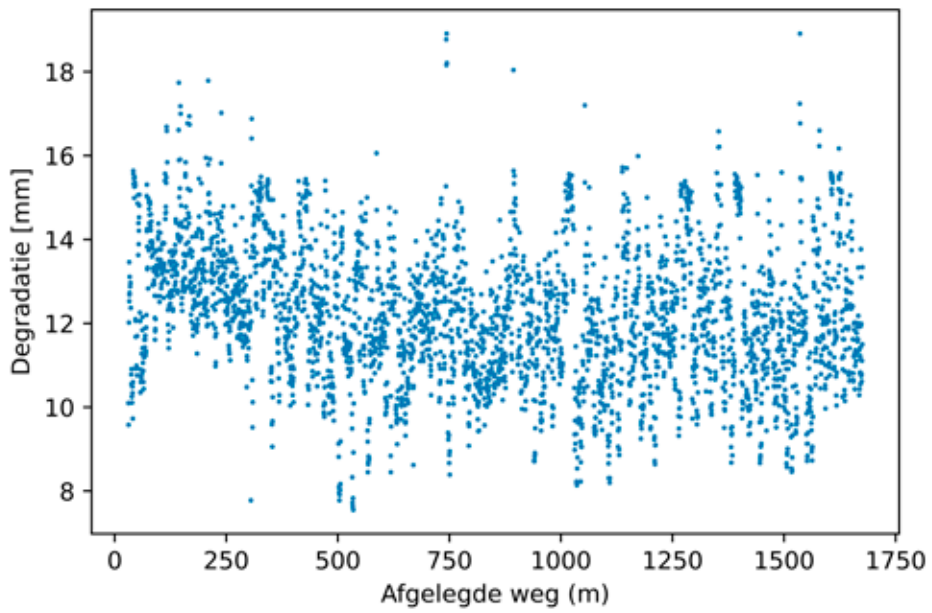
Maximale uitloging Aa en Maas P20-019



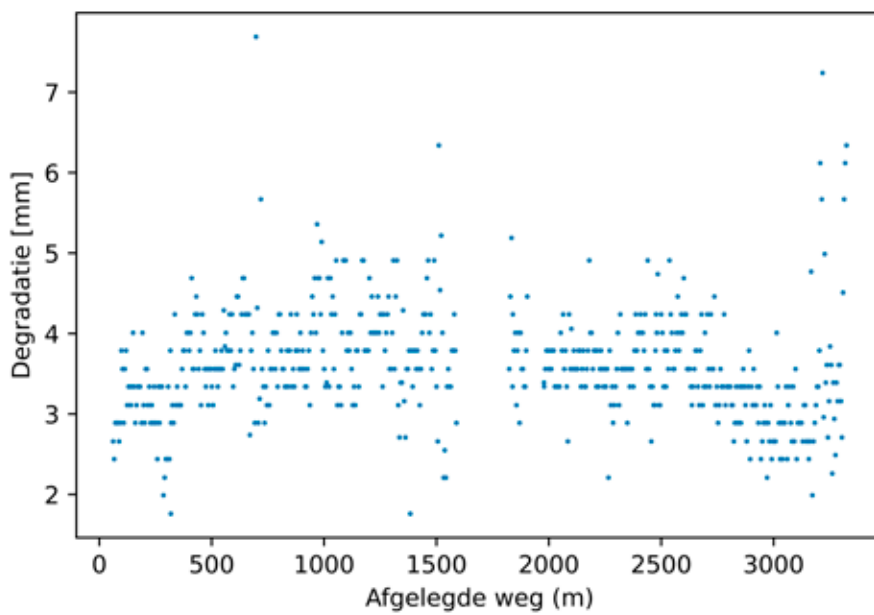
Maximale uitloging Aa en Maas P21-004



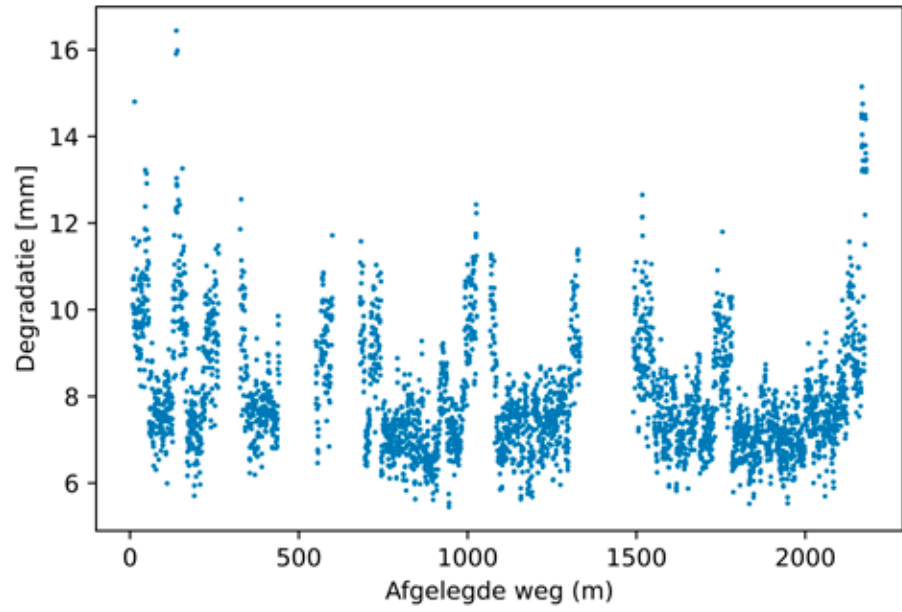
Maximale uitlogging Brabantse Delta P20-010



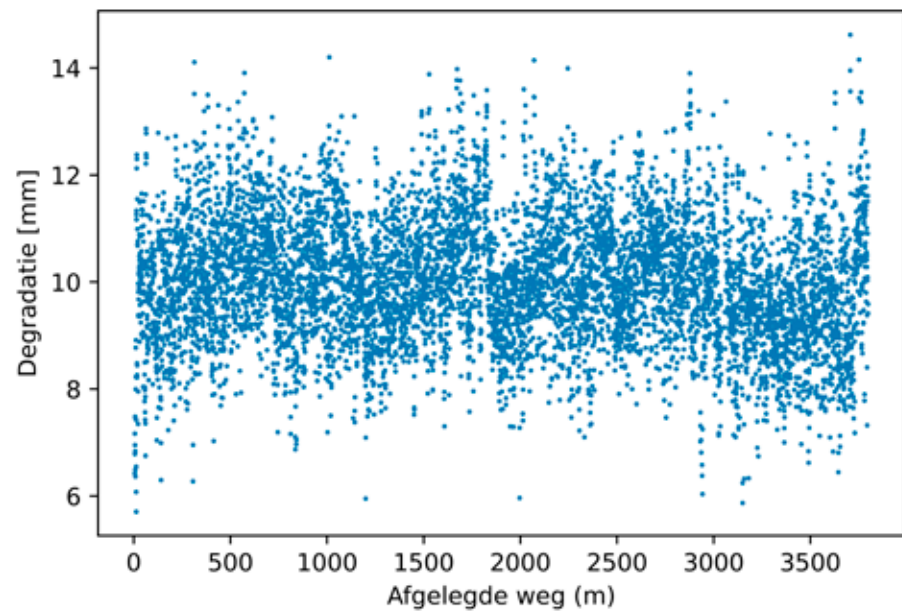
Maximale uitlogging Brabantse Delta P21-015



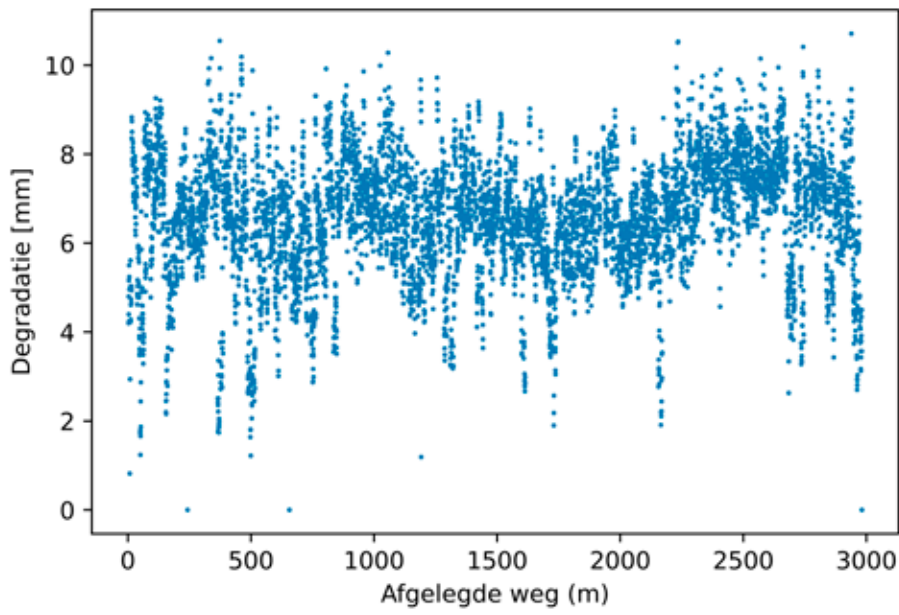
Maximale uitlogging Drents Overijsselse Delta P19-004



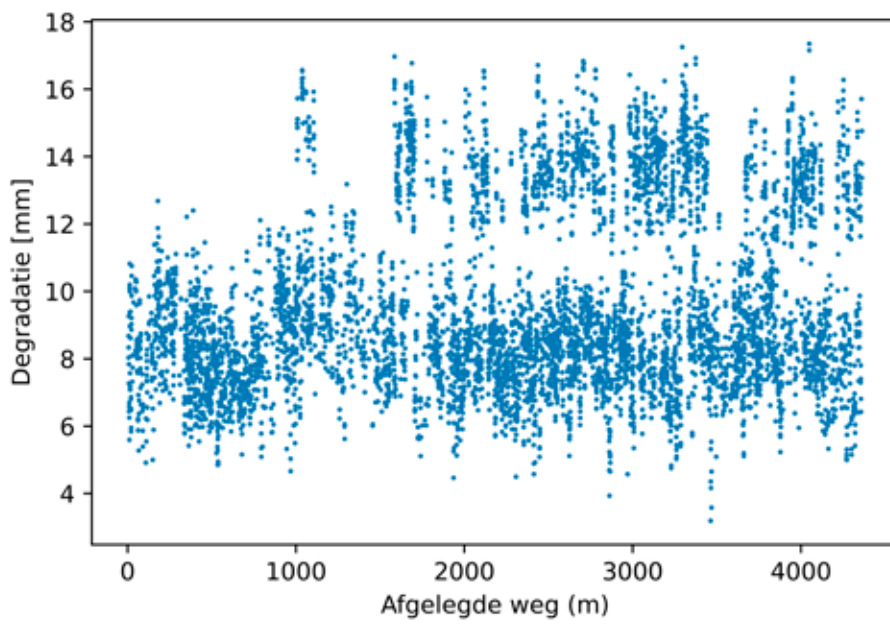
Maximale uitlogging Drents Overijsselse Delta P19-018



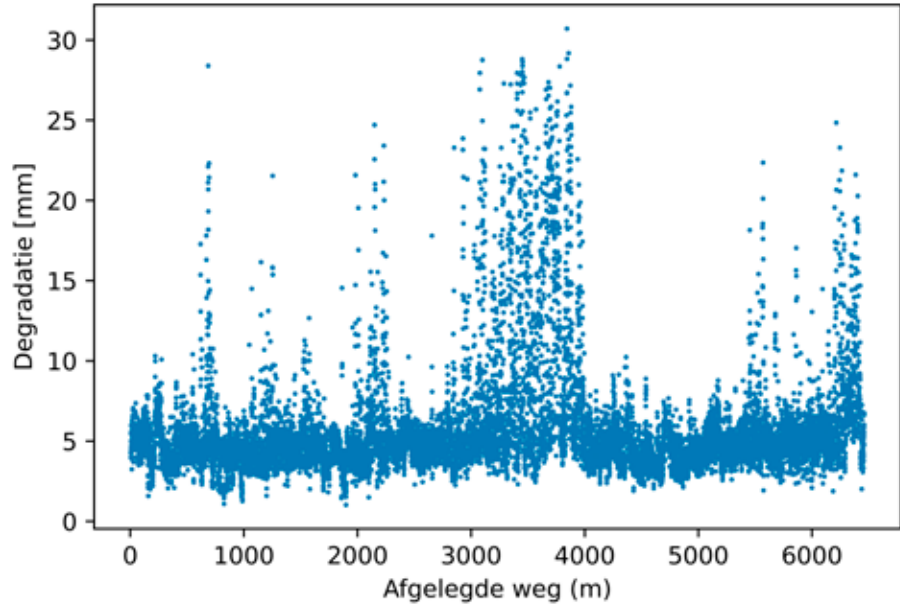
Maximale uitloging Drents Overijsselse Delta P21-010



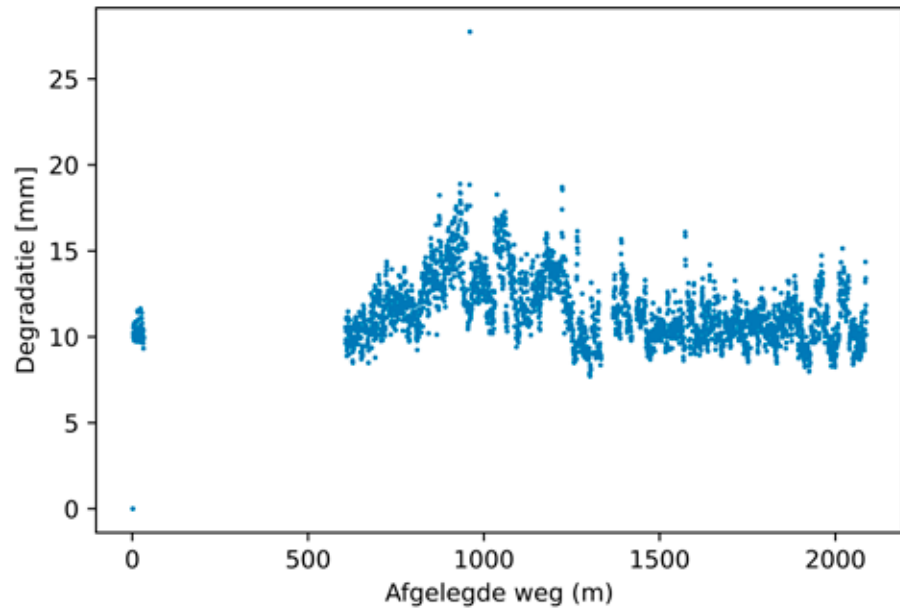
Maximale uitloging Limburg P17-003



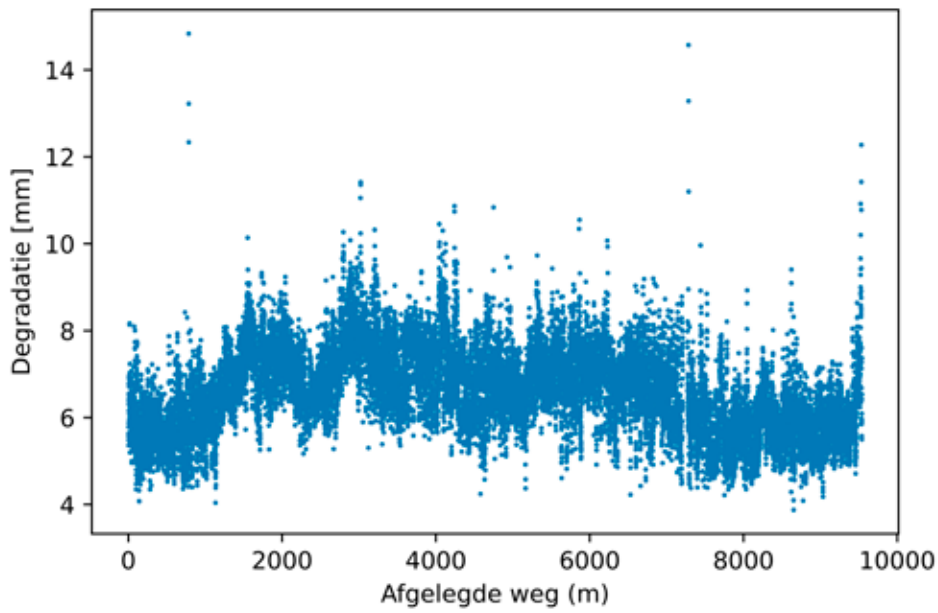
Maximale uitloging Limburg P19-017



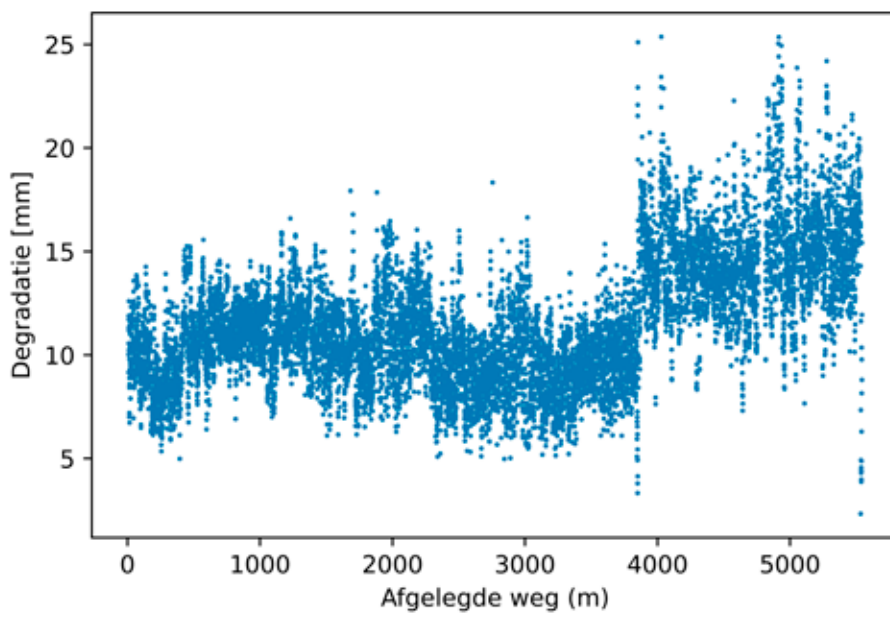
Maximale uitloging Limburg P19-022



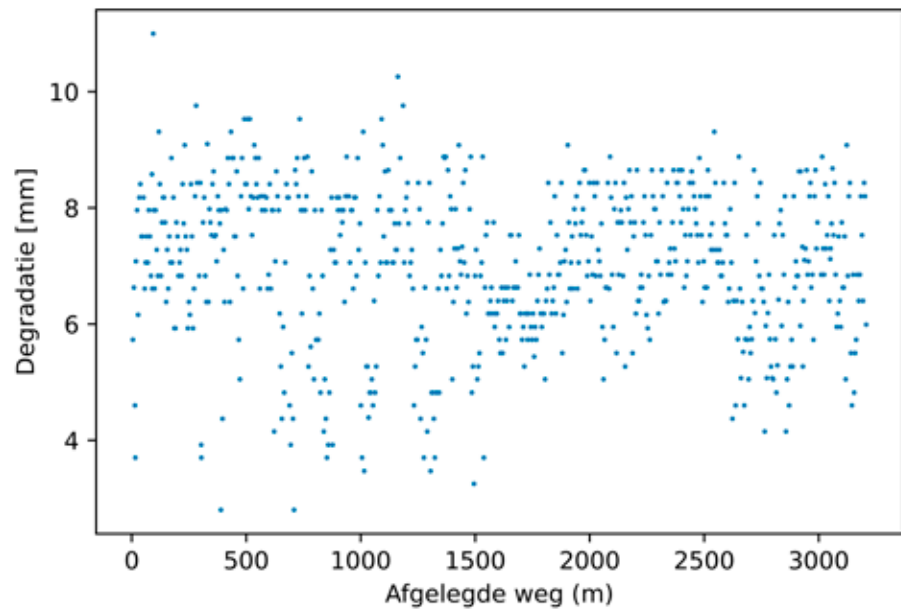
Maximale uitloging Rijn en IJssel P19-019



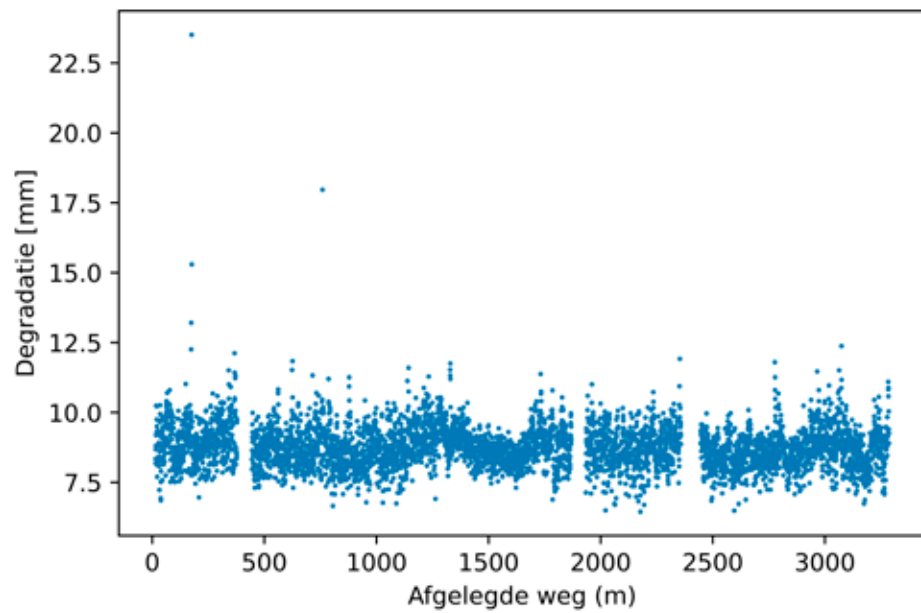
Maximale uitloging Vallei en Veluwe P20-030



Maximale uitloging Vallei en Veluwe P21-028

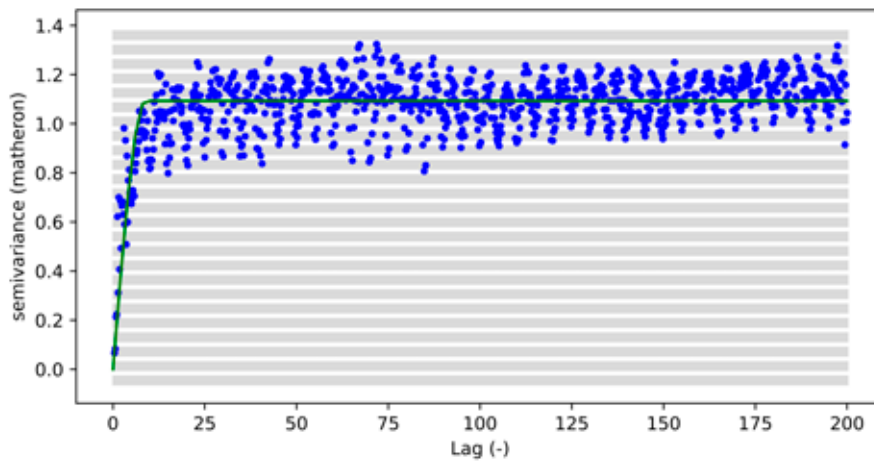


Maximale uitloging Zuiderzeeland P18-018

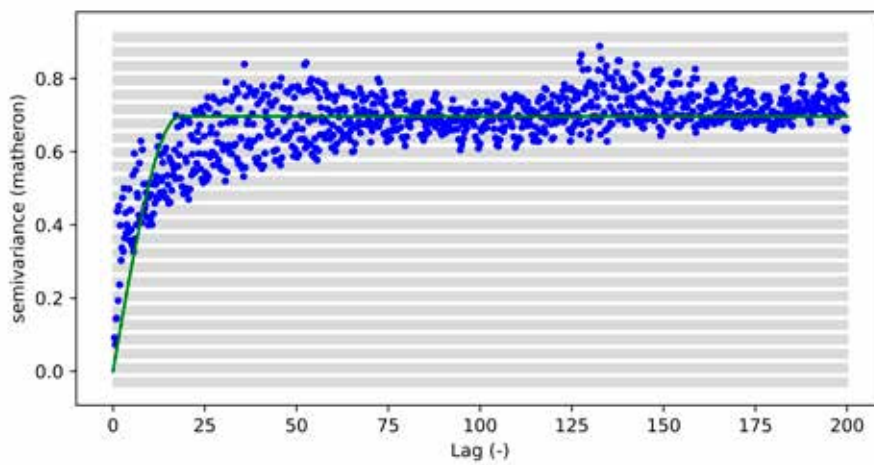


Bijlage 3 – Ruimtelijke correlatie gemiddelde uitloging dataset III

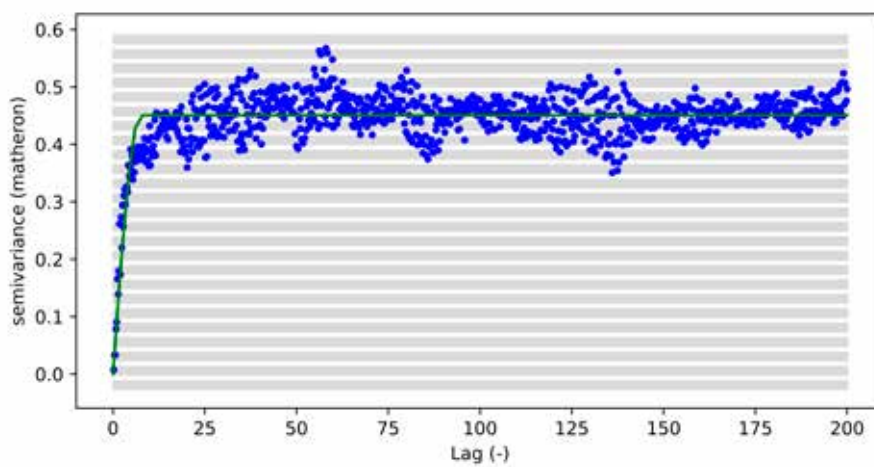
Gemiddelde uitloging Aa en Maas P19-006



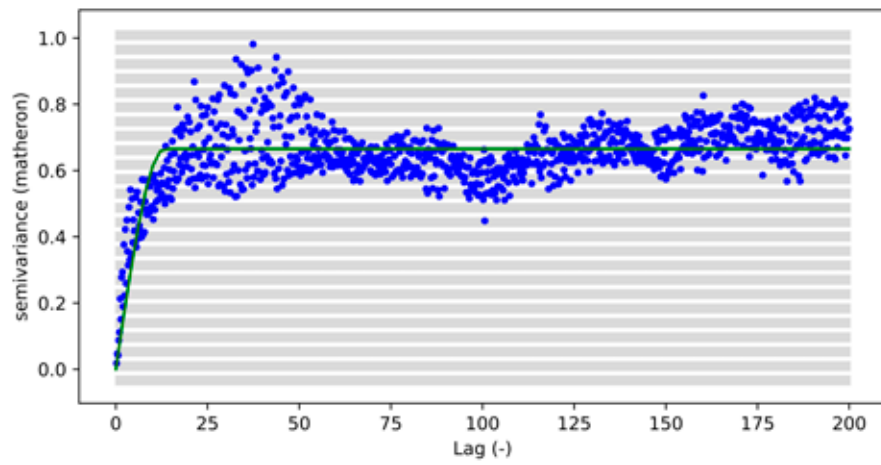
Gemiddelde uitloging Aa en Maas P19-007



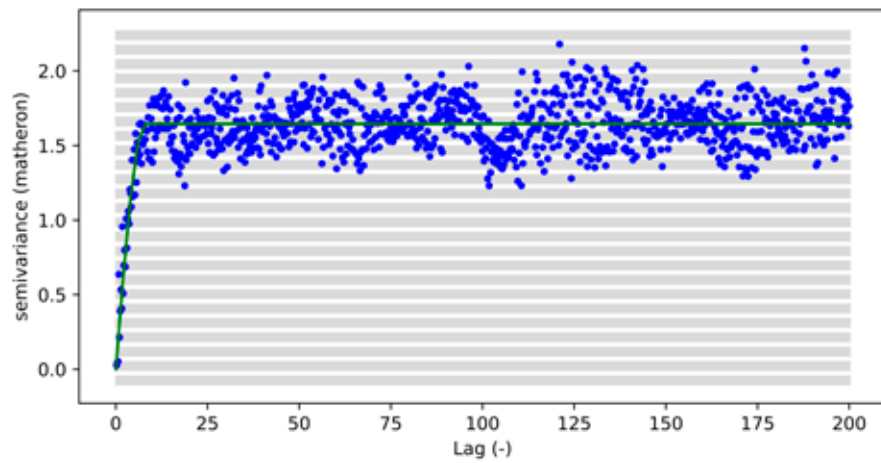
Gemiddelde uitloging Aa en Maas P19-028



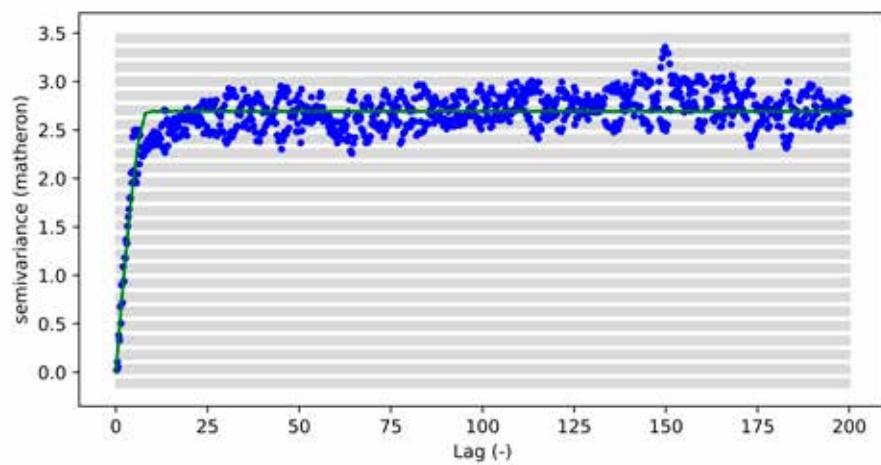
Gemiddelde uitloging Aa en Maas P19-029

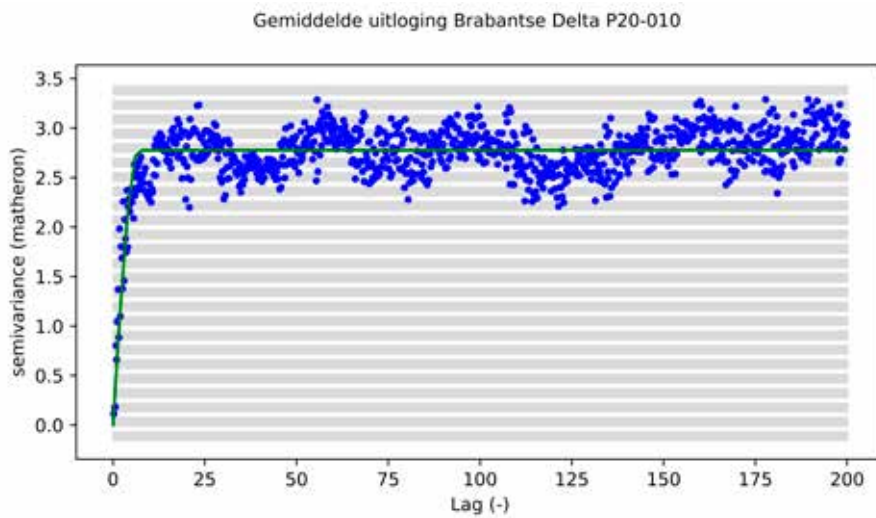
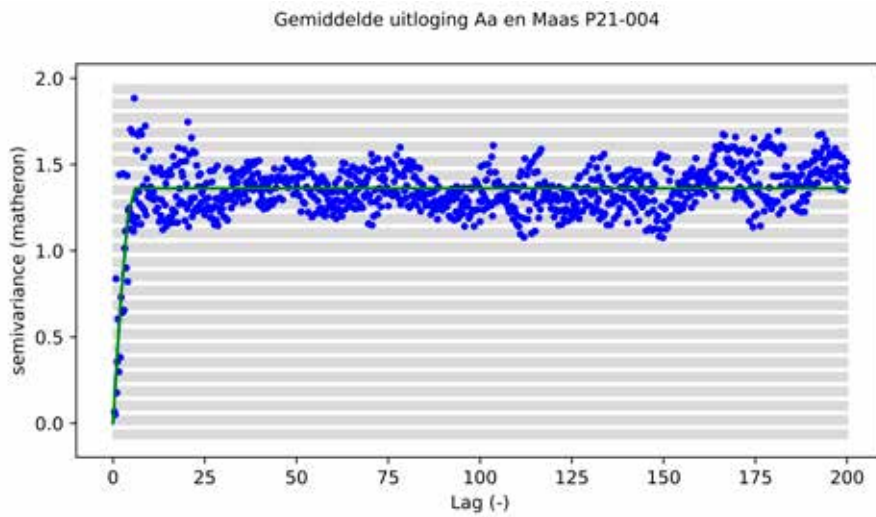
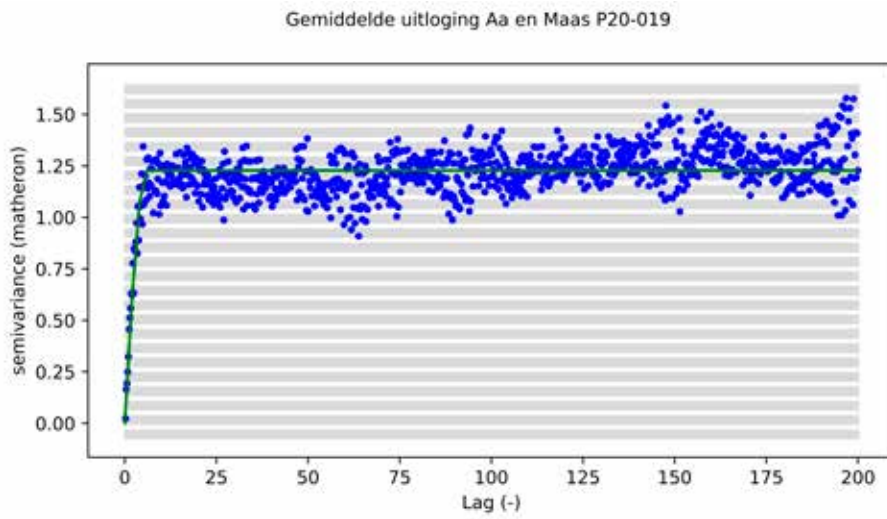


Gemiddelde uitloging Aa en Maas P20-011

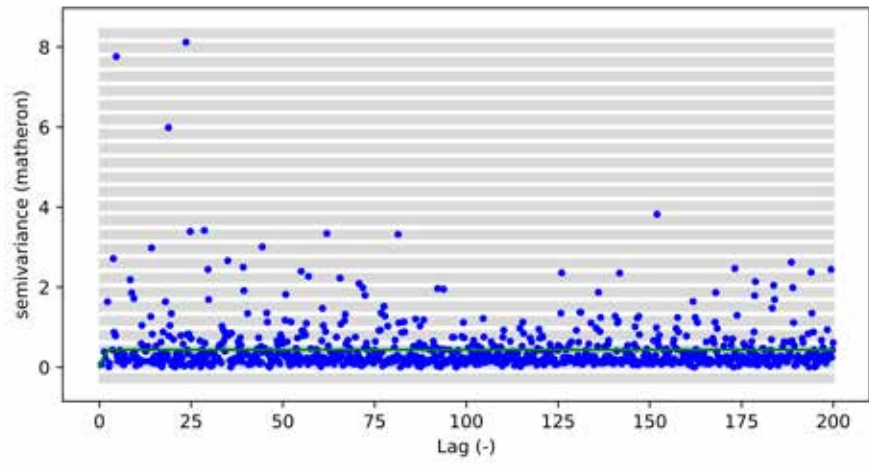


Gemiddelde uitloging Aa en Maas P20-012

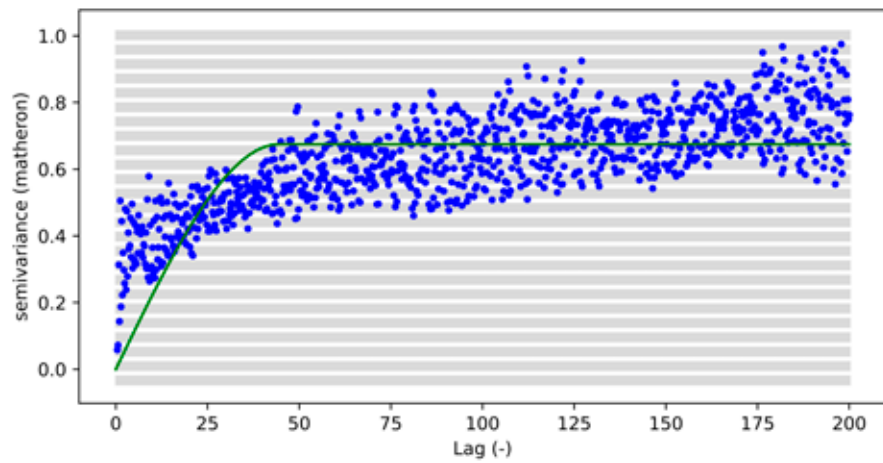




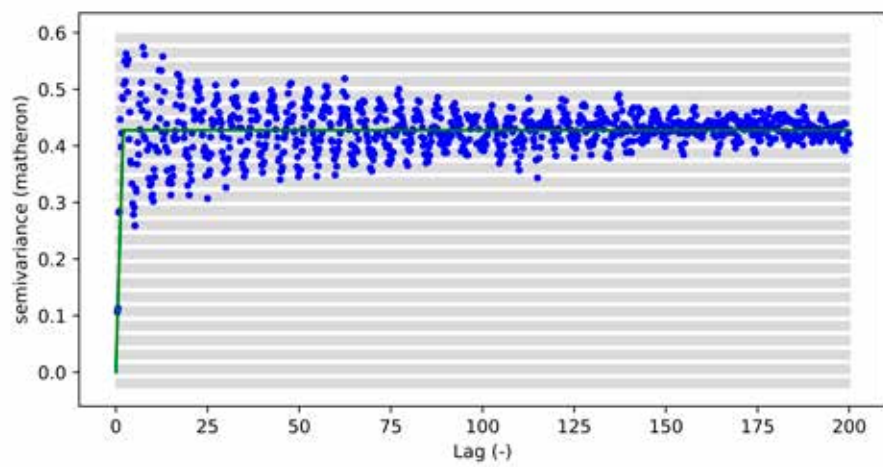
Gemiddelde uitlogging Brabantse Delta P21-015

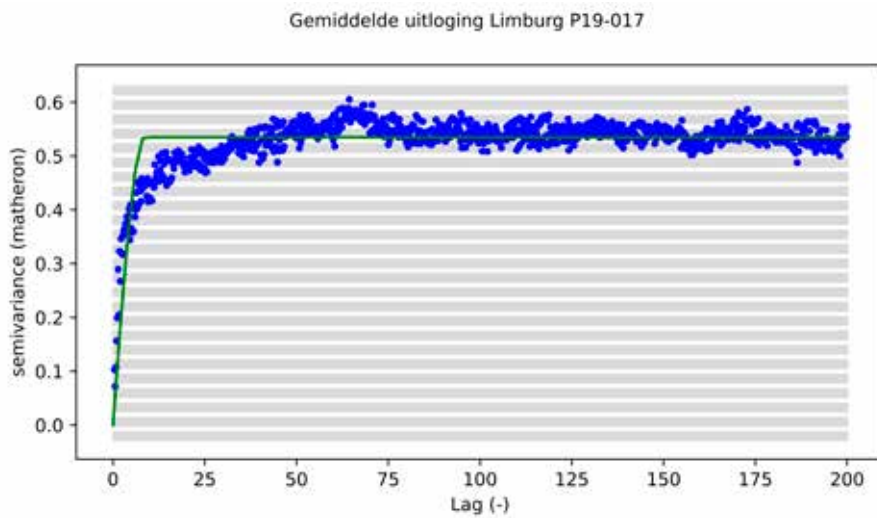
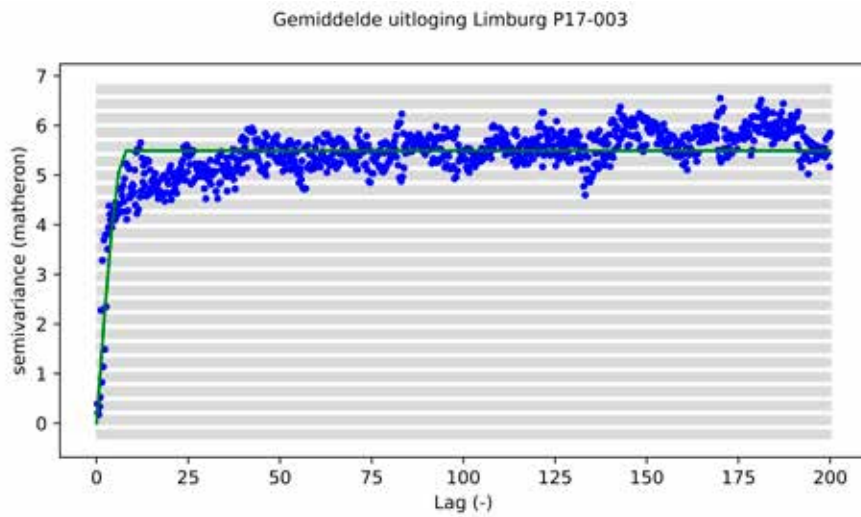
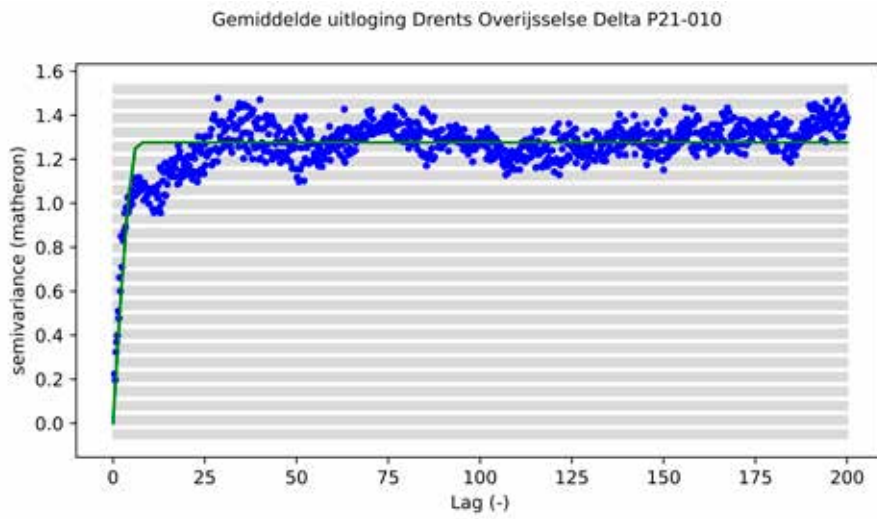


Gemiddelde uitlogging Drents Overijsselse Delta P19-004

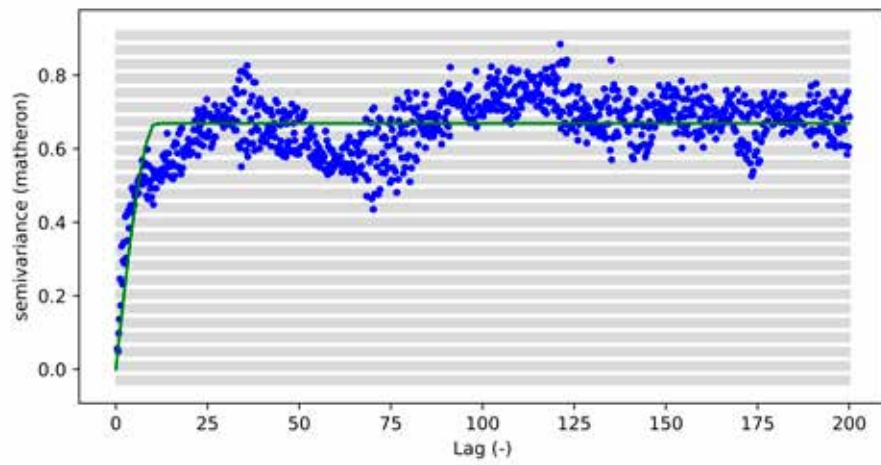


Gemiddelde uitlogging Drents Overijsselse Delta P19-018

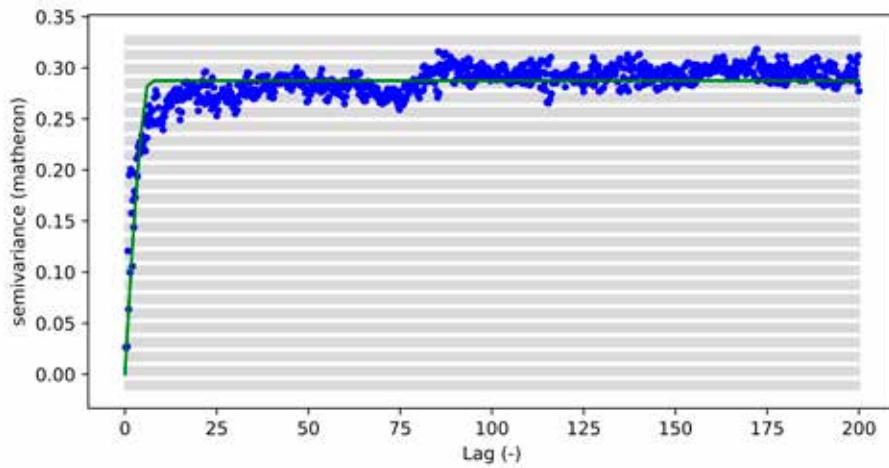




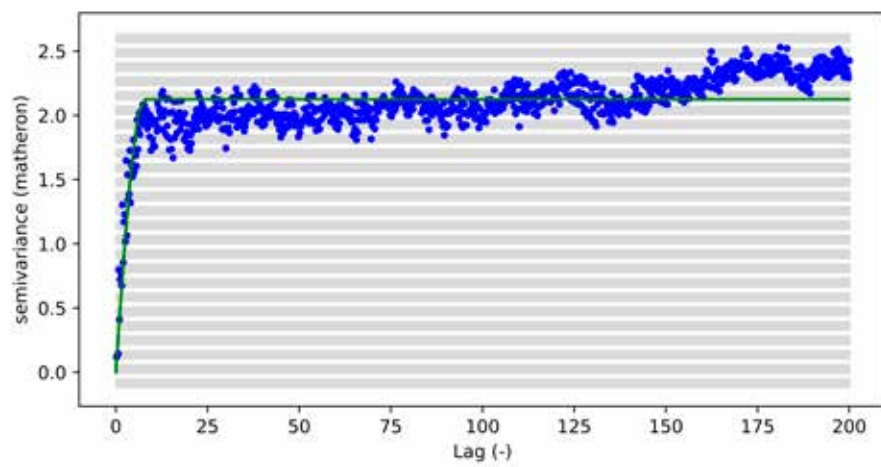
Gemiddelde uitloging Limburg P19-022



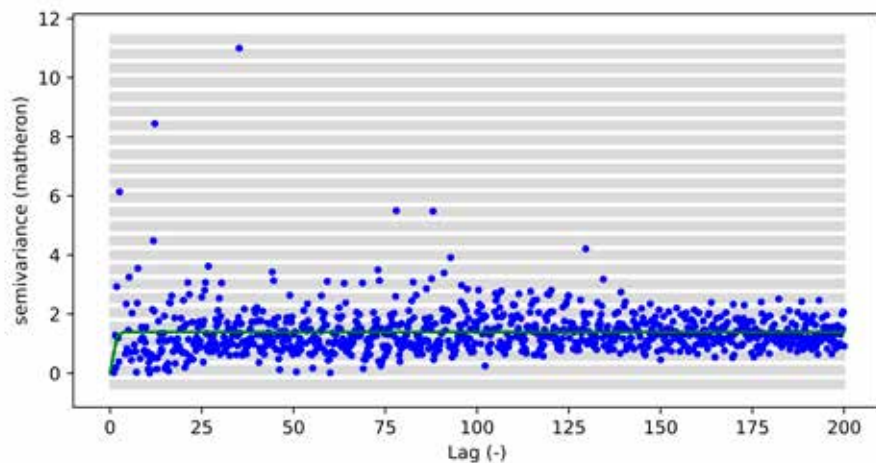
Gemiddelde uitloging Rijn en IJssel P19-019



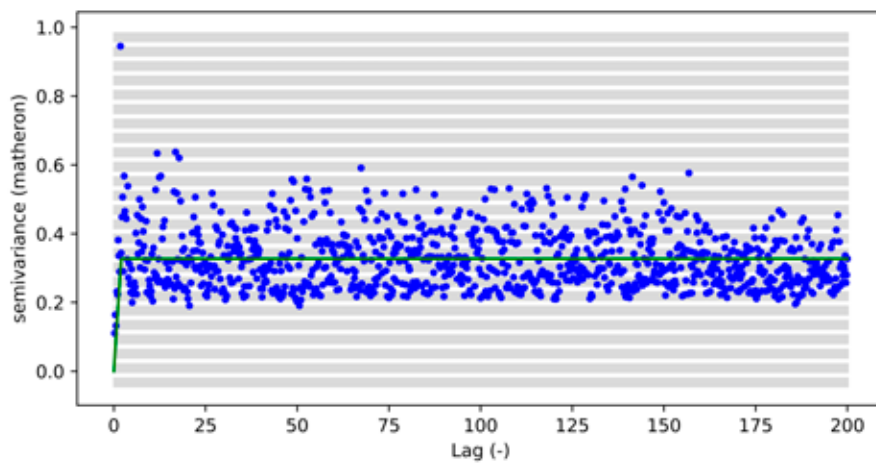
Gemiddelde uitloging Vallei en Veluwe P20-030



Gemiddelde uitloging Vallei en Veluwe P21-028

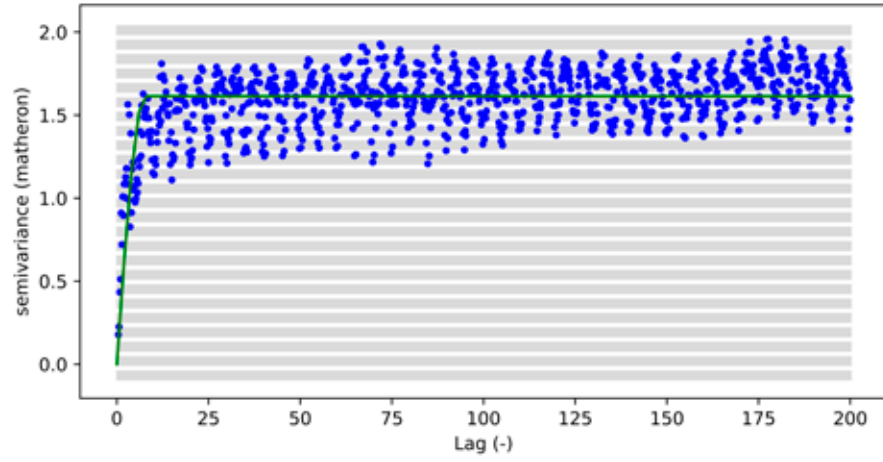


Gemiddelde uitloging Zuiderzeeland P18-018

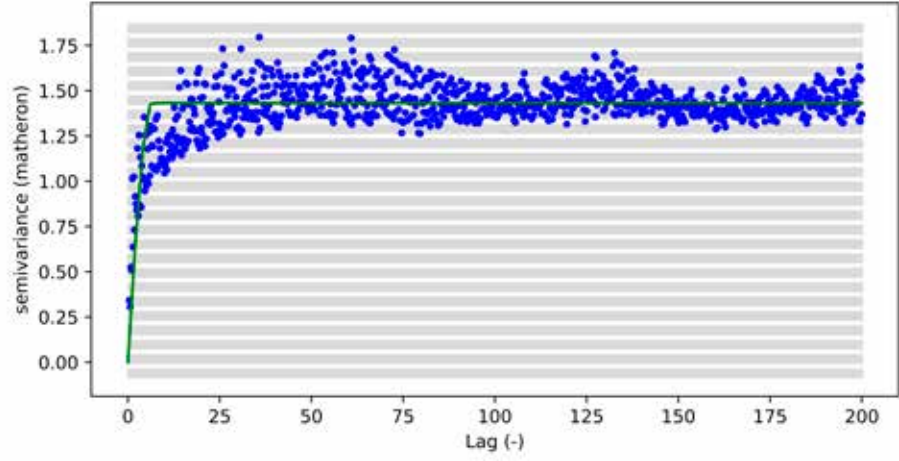


Bijlage 4 – Ruimtelijke correlatie maximale uitloging dataset III

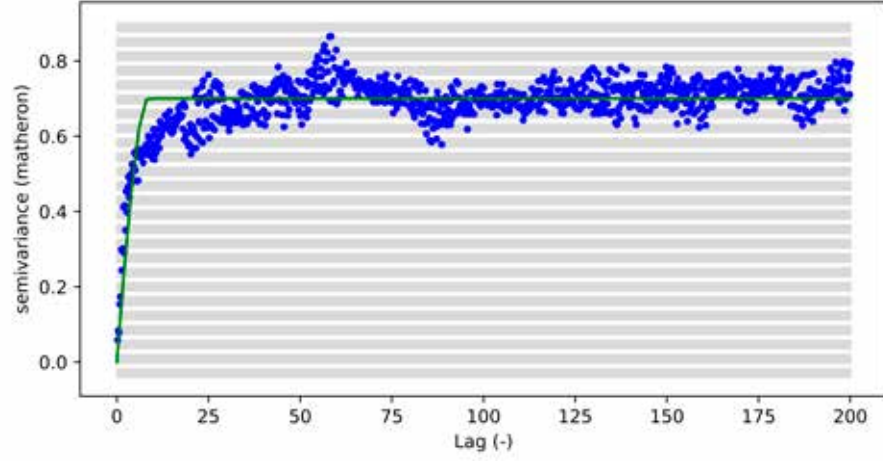
Maximale uitloging Aa en Maas P19-006

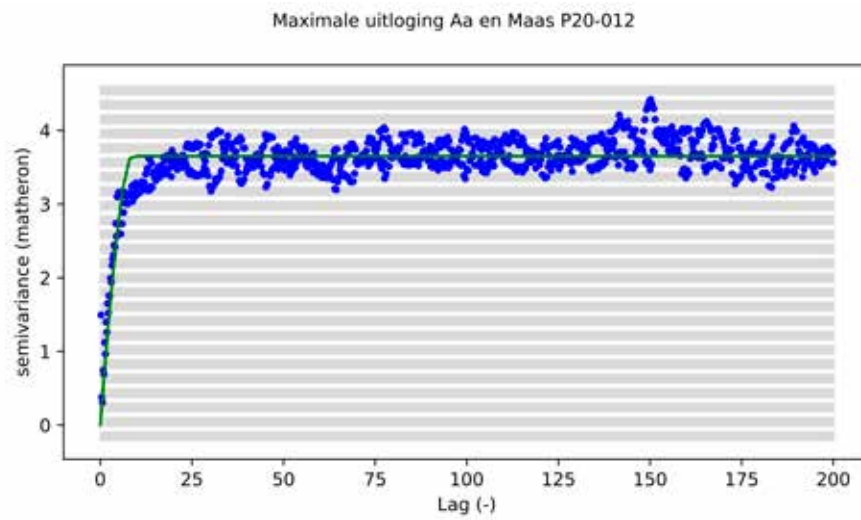
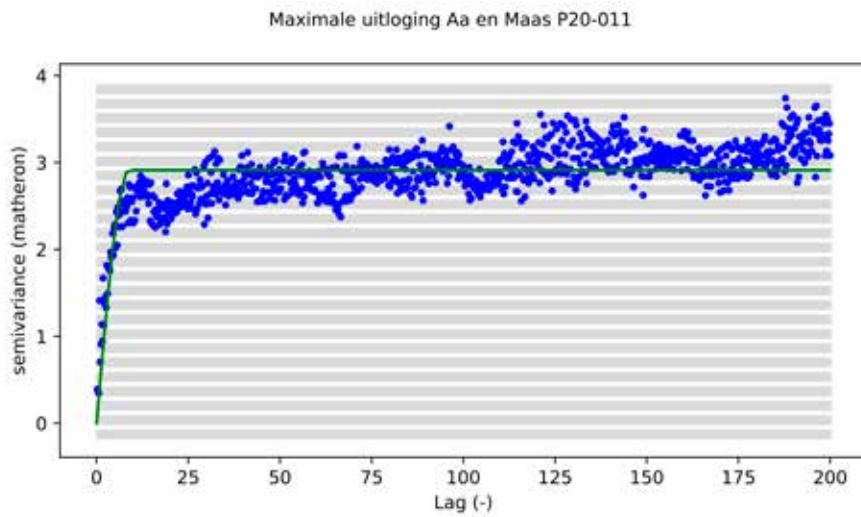
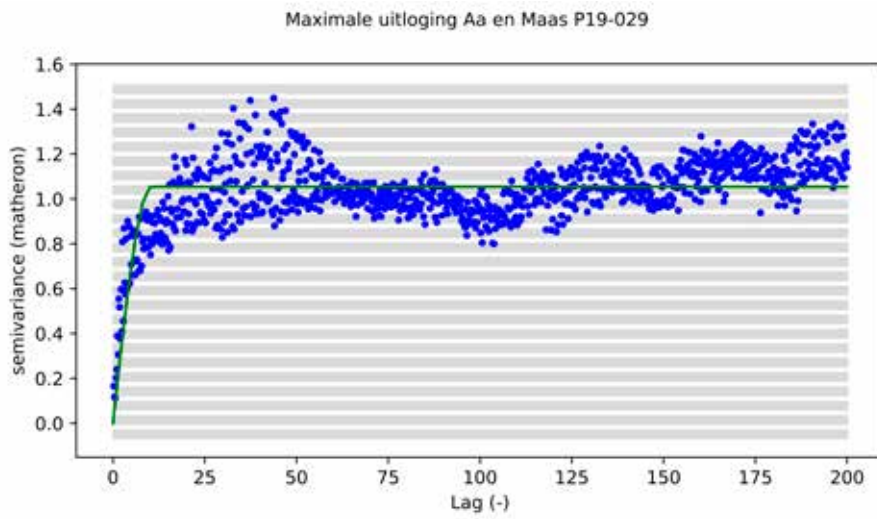


Maximale uitloging Aa en Maas P19-007

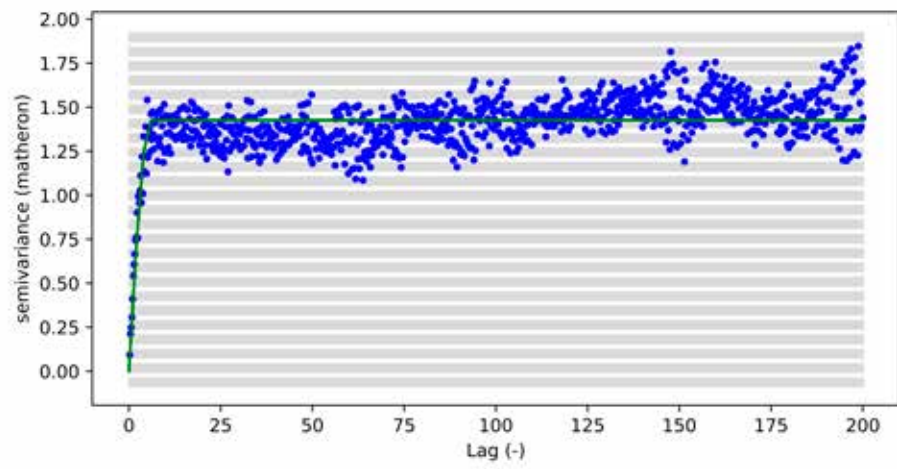


Maximale uitloging Aa en Maas P19-028

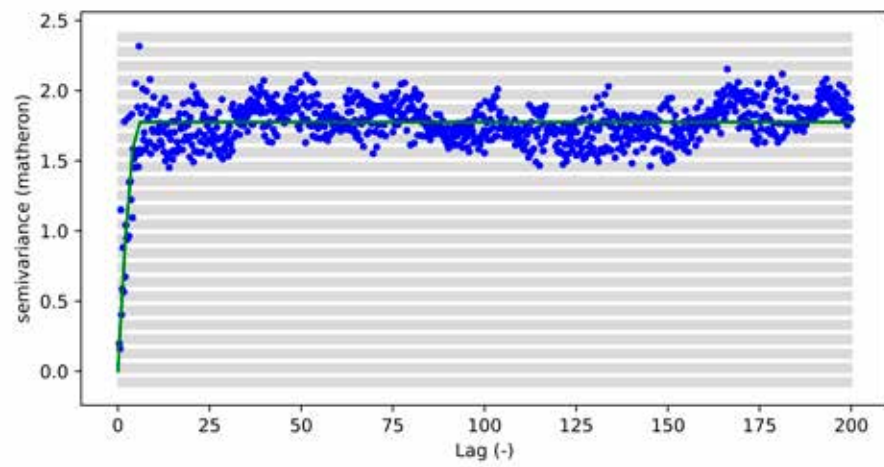




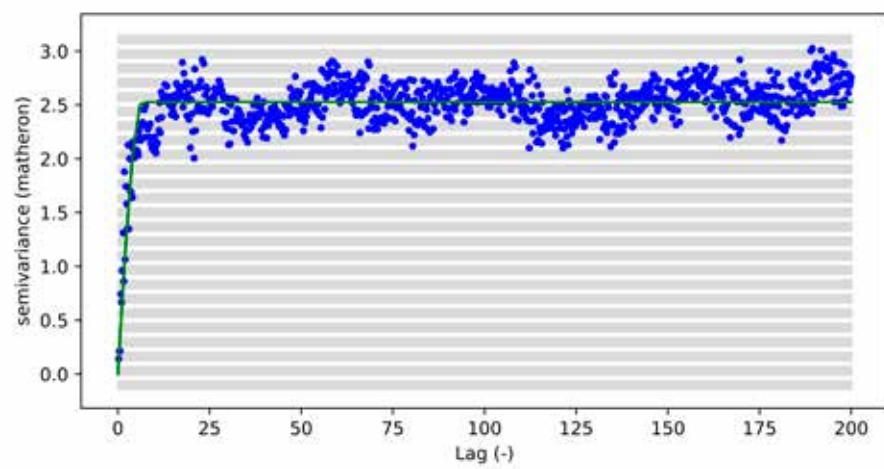
Maximale uitloging Aa en Maas P20-019



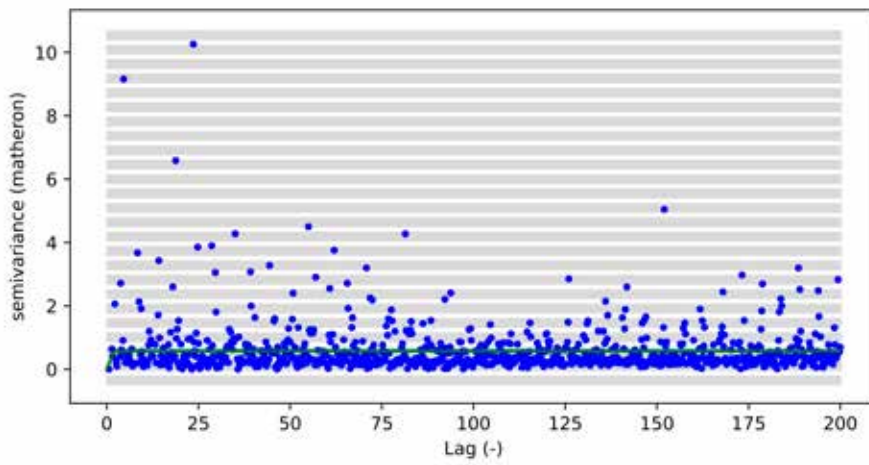
Maximale uitloging Aa en Maas P21-004



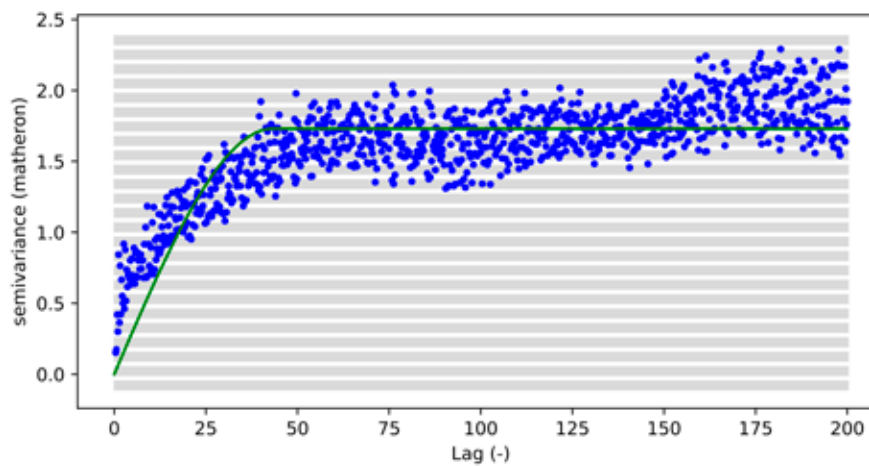
Maximale uitloging Brabantse Delta P20-010



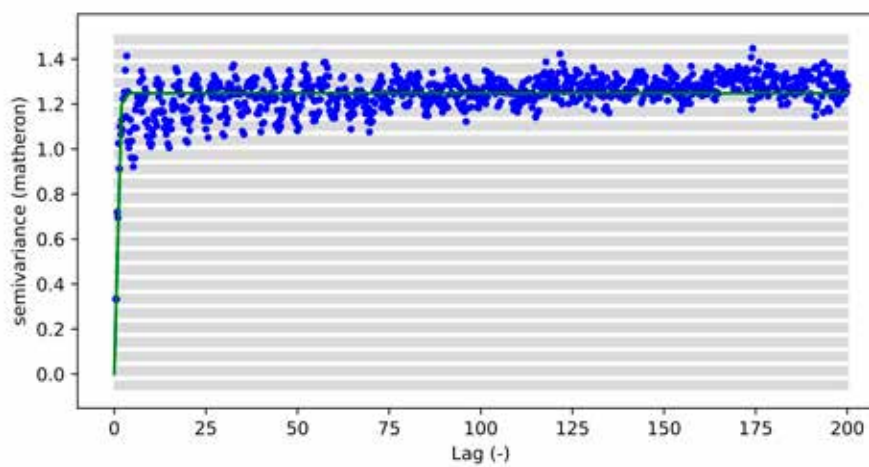
Maximale uitloging Brabantse Delta P21-015



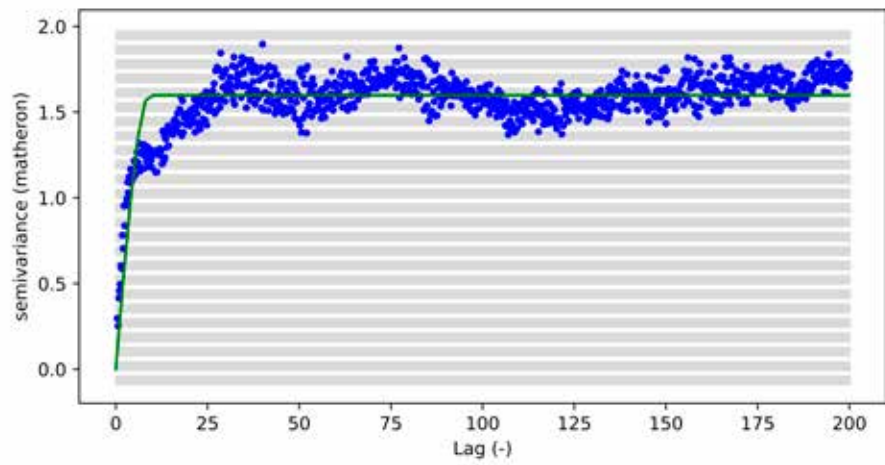
Maximale uitloging Drents Overijsselse Delta P19-004



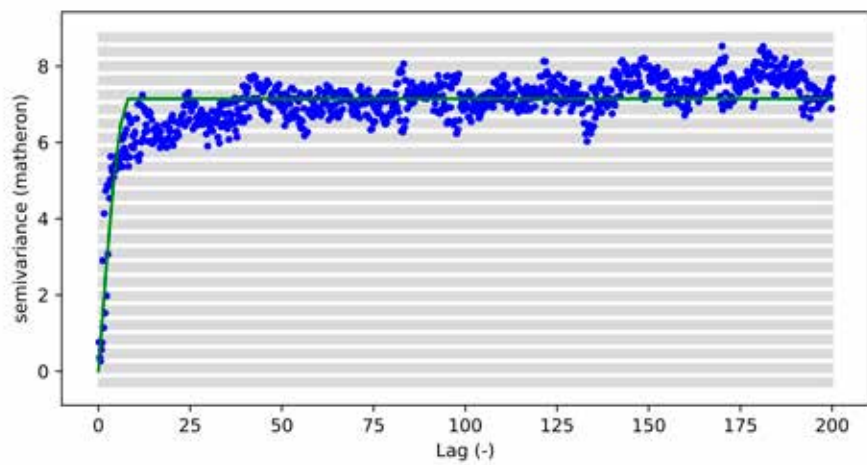
Maximale uitloging Drents Overijsselse Delta P19-018



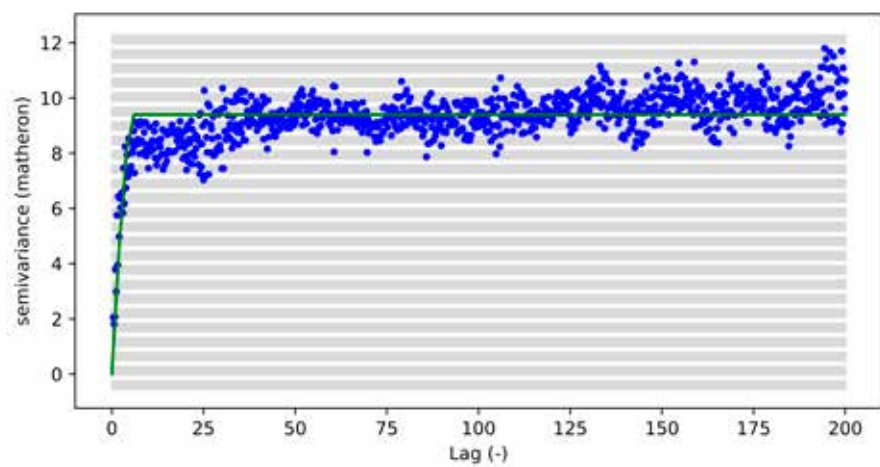
Maximale uitloging Drents Overijsselse Delta P21-010



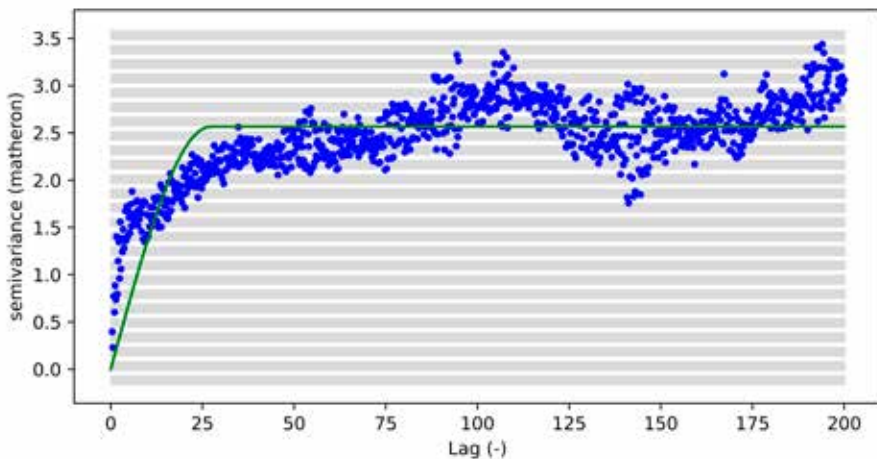
Maximale uitloging Limburg P17-003



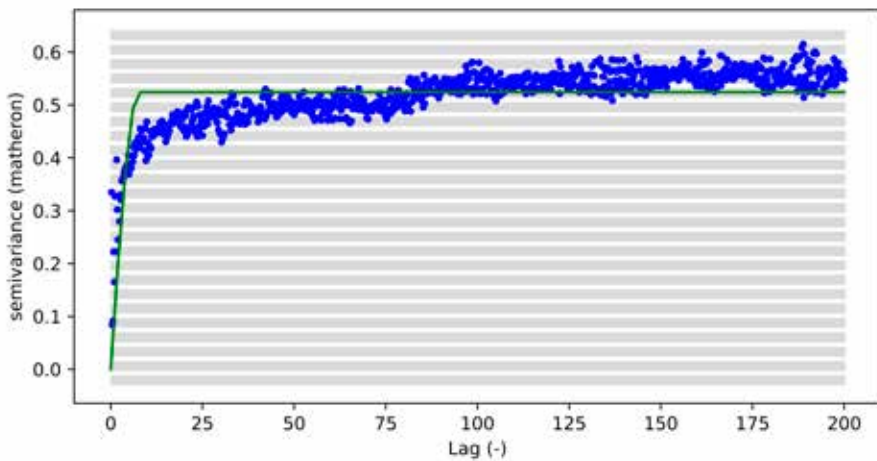
Maximale uitloging Limburg P19-017



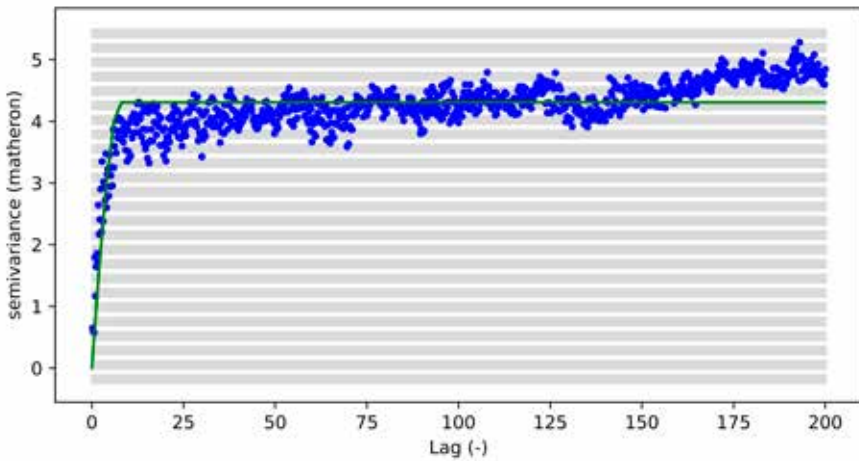
Maximale uitloging Limburg P19-022



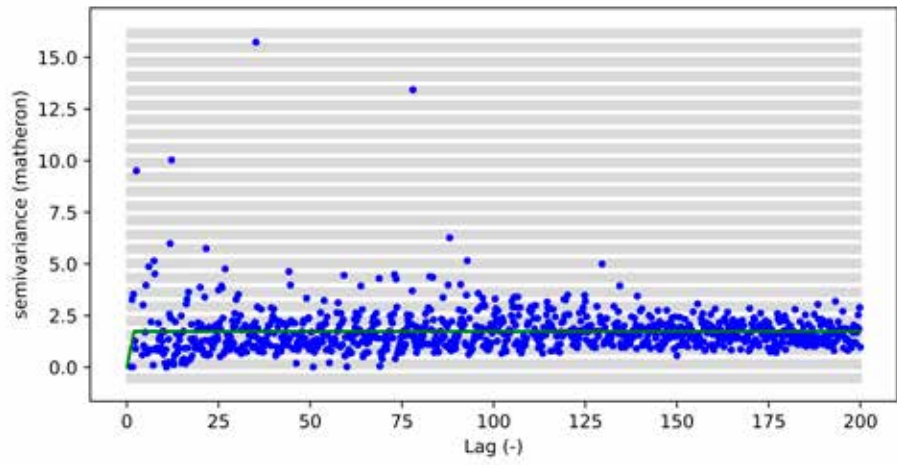
Maximale uitloging Rijn en IJssel P19-019



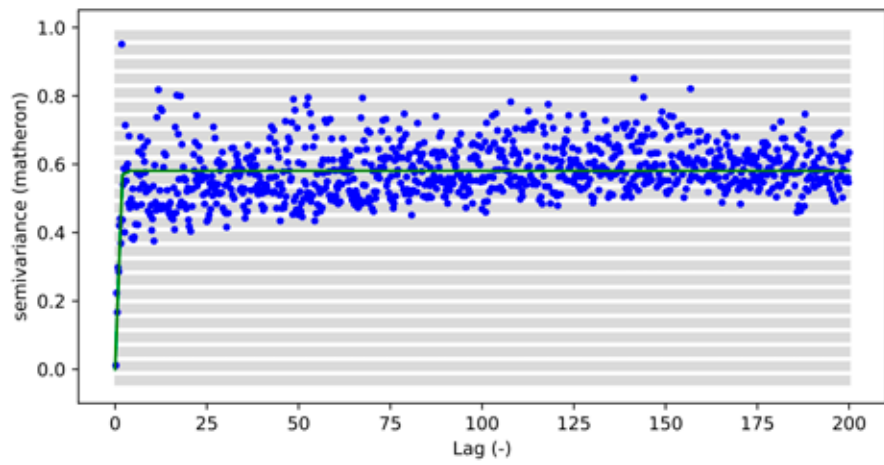
Maximale uitloging Vallei en Veluwe P20-030



Maximale uitloging Vallei en Veluwe P21-028

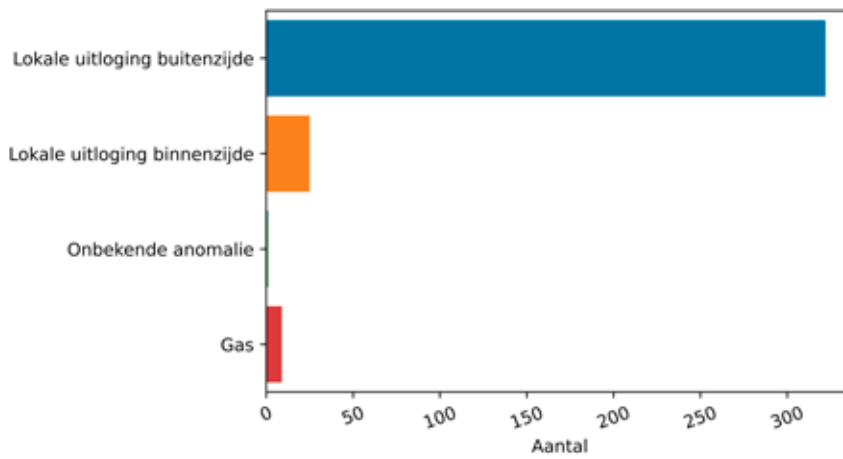


Maximale uitloging Zuiderzeeland P18-018

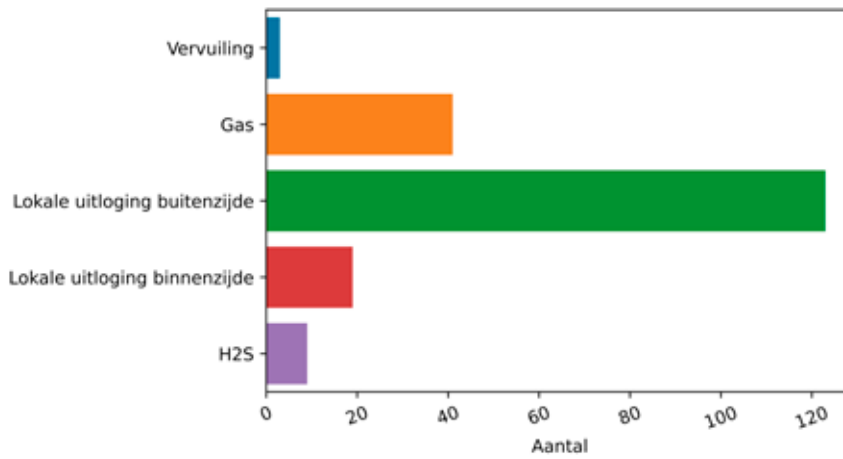


Bijlage 5 – Afwijking type

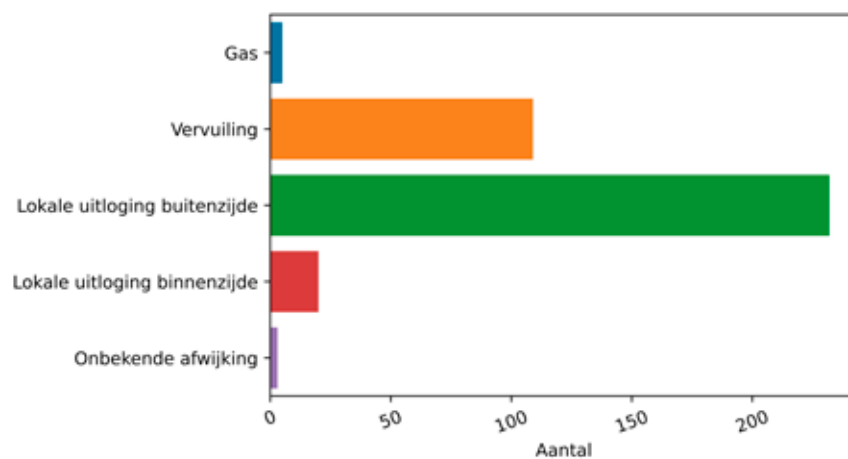
Afwijking type Aa en Maas P21-004



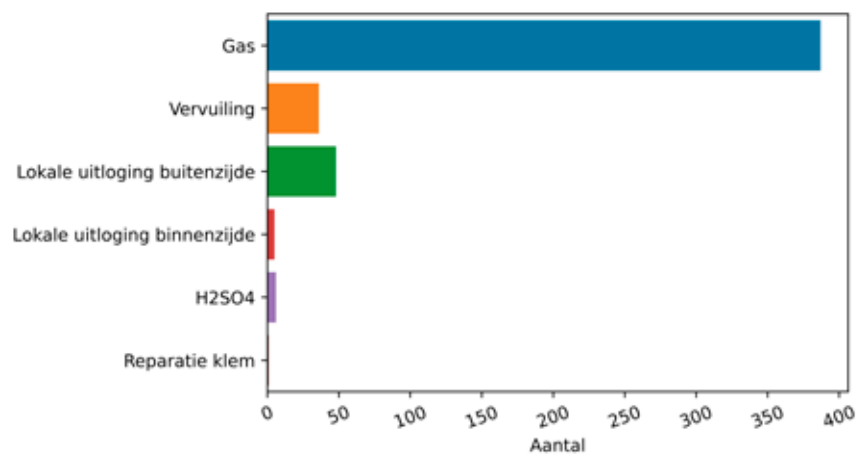
Afwijking type Drents Overijsselse Delta P21-010



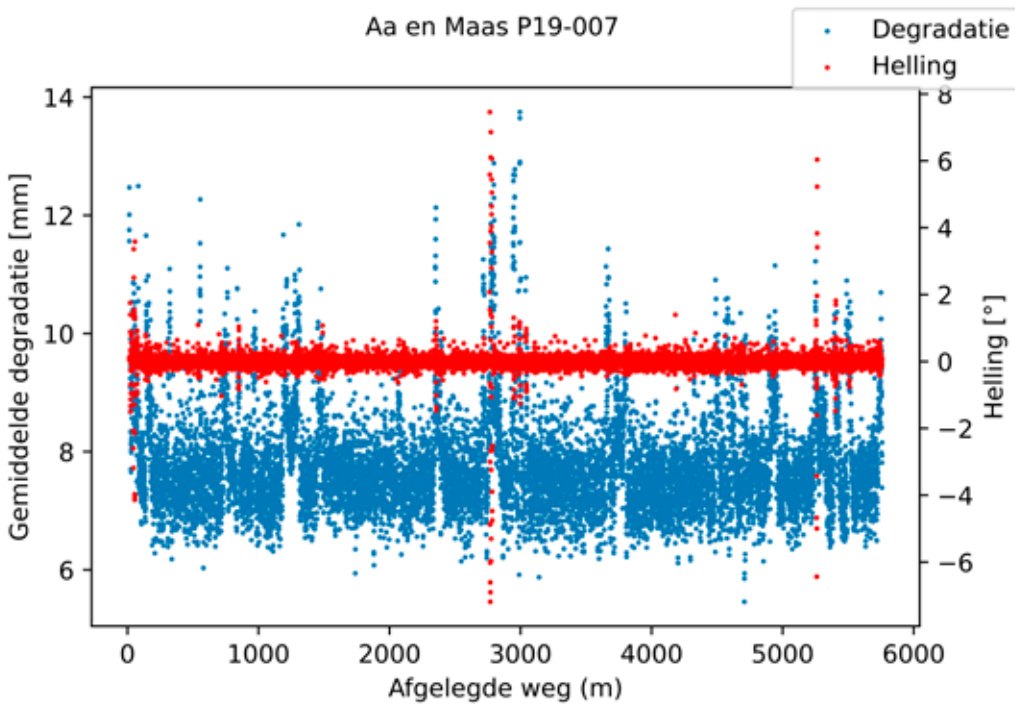
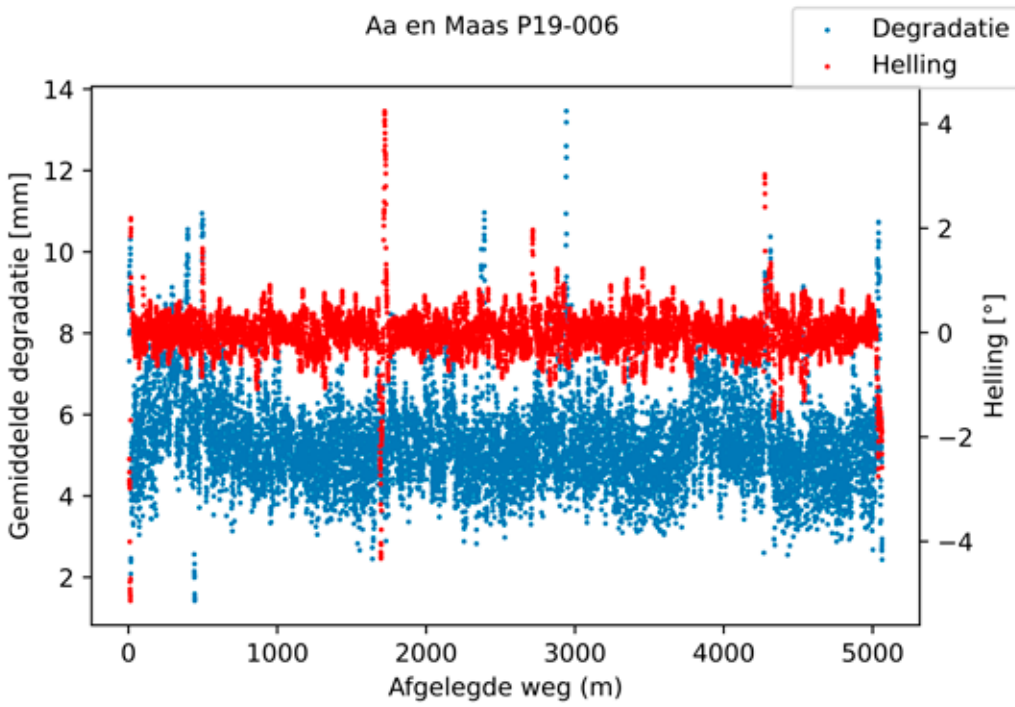
Afwijking type Brabantse Delta P21-015

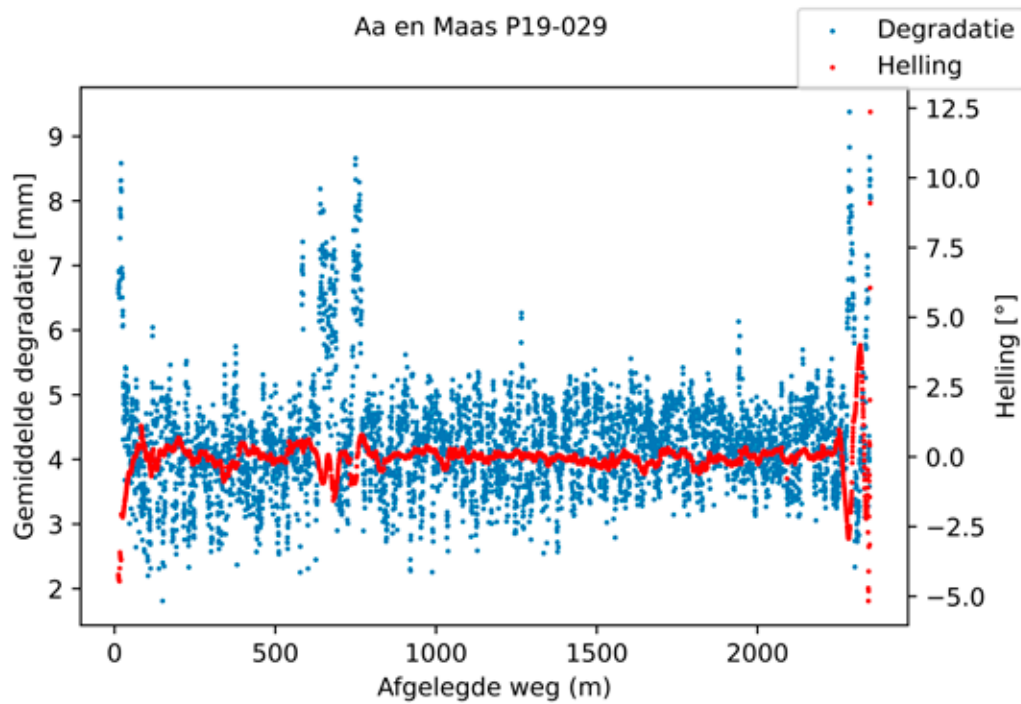
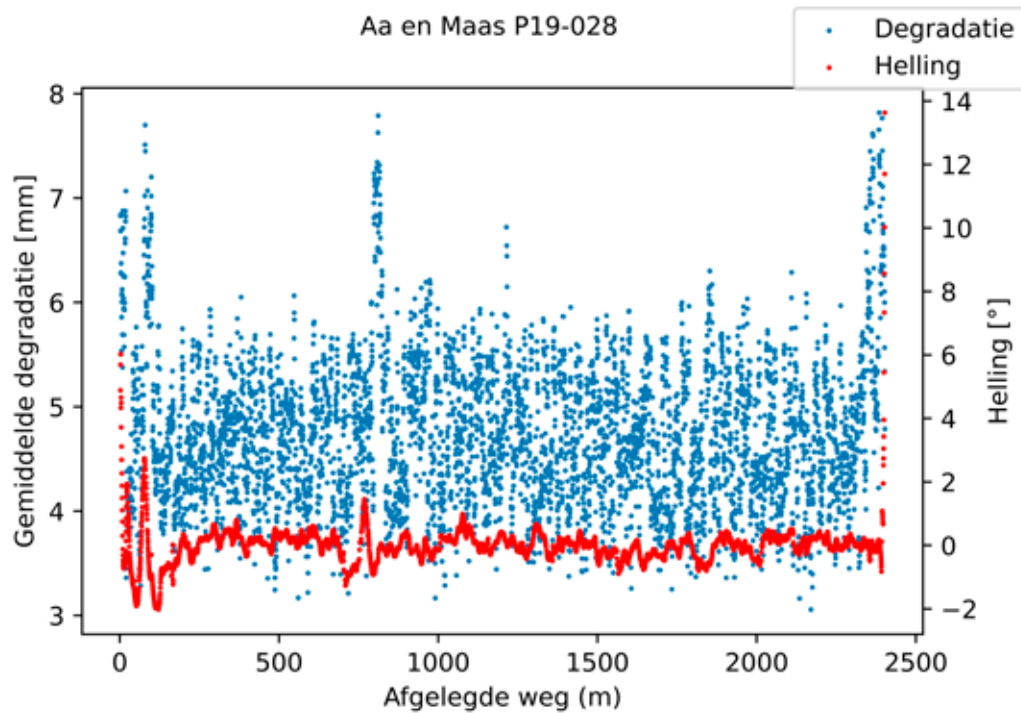


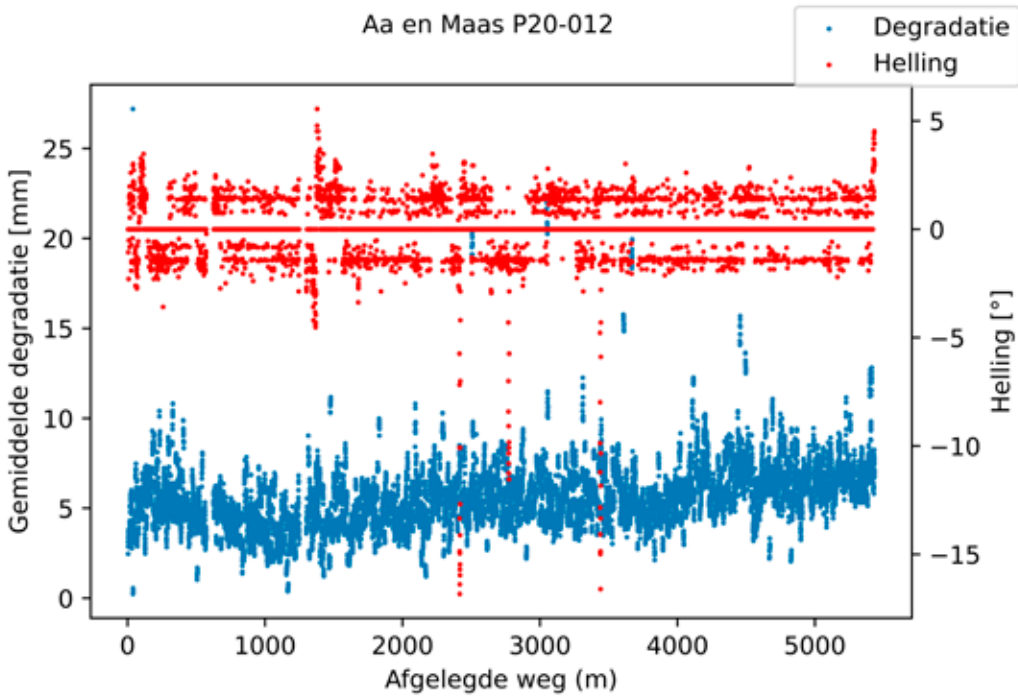
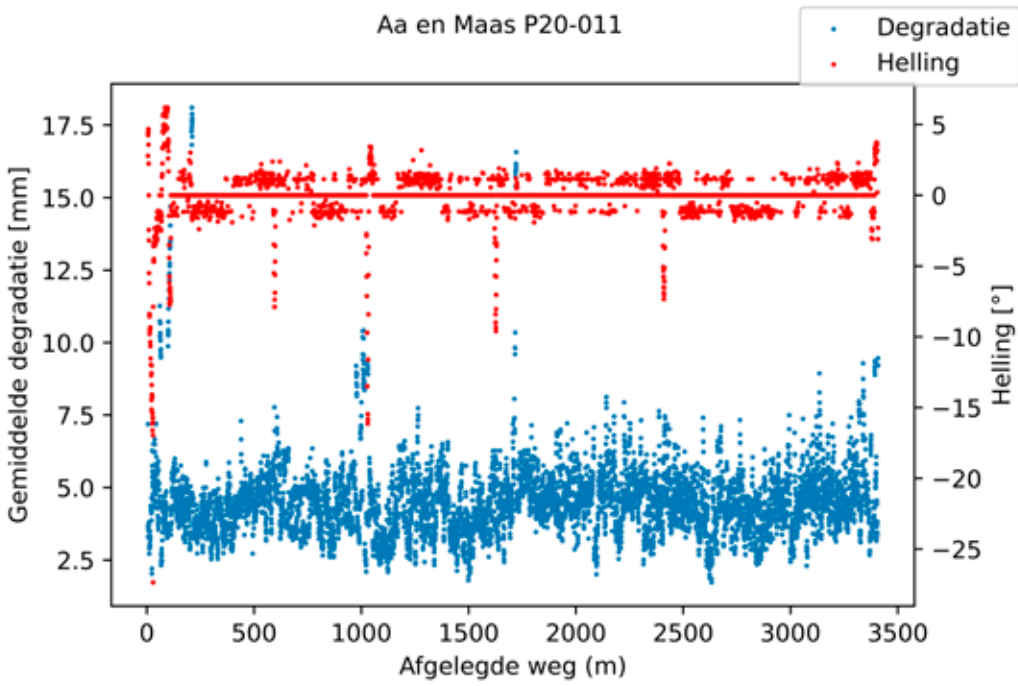
Afwijking type Vallei en Velluwe P21-028

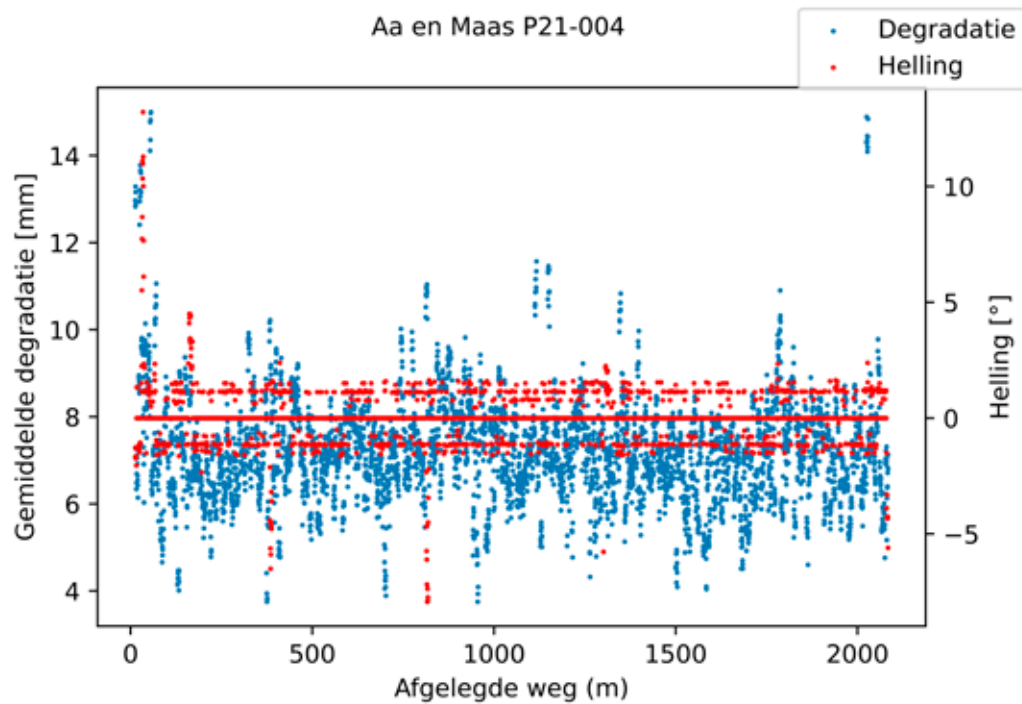
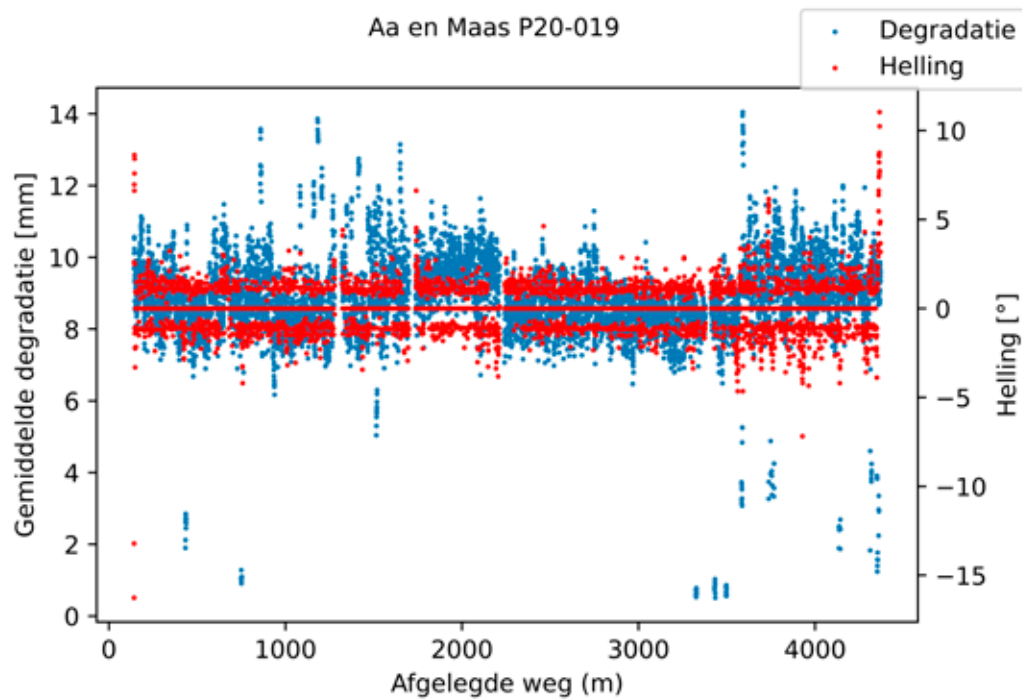


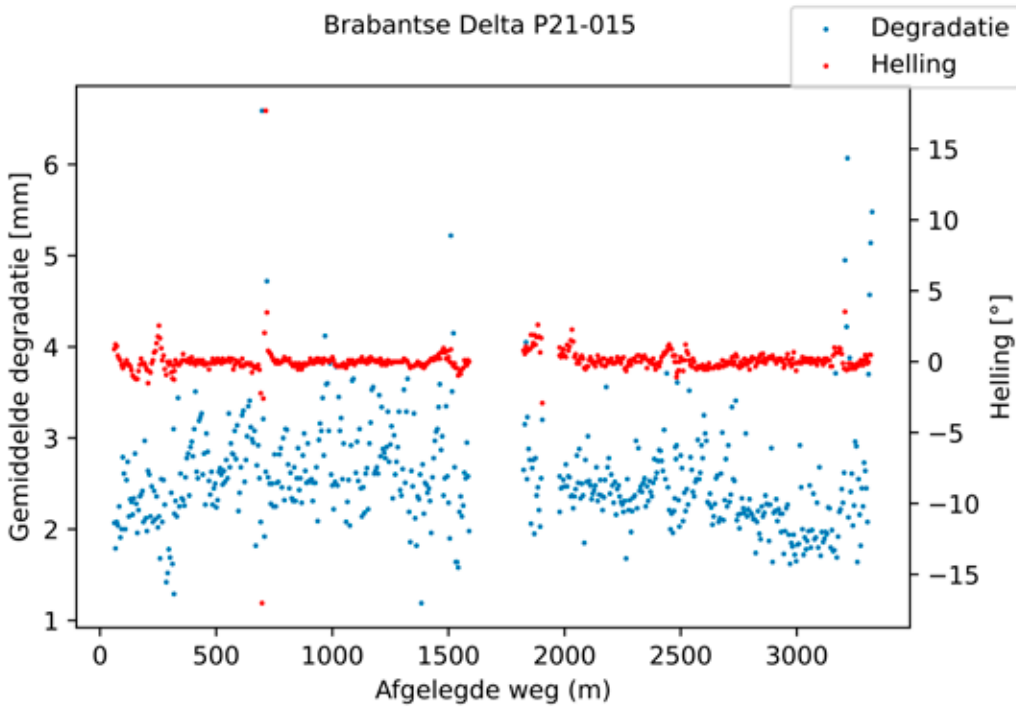
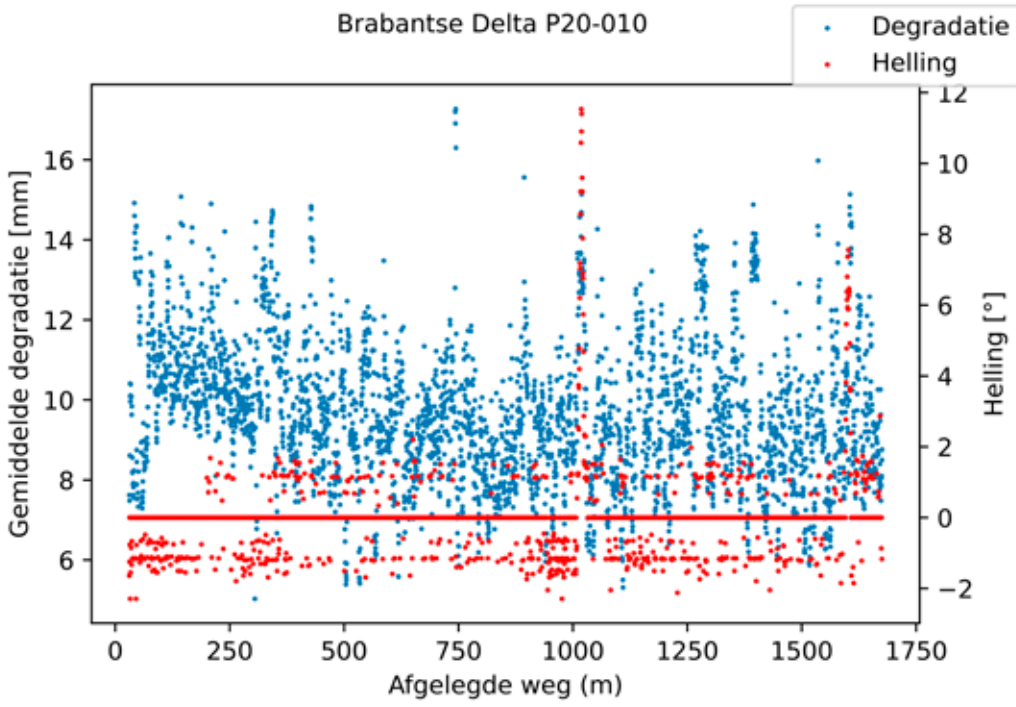
Bijlage 6 – Relatie tussen gemiddelde degradatieprofiel en helling

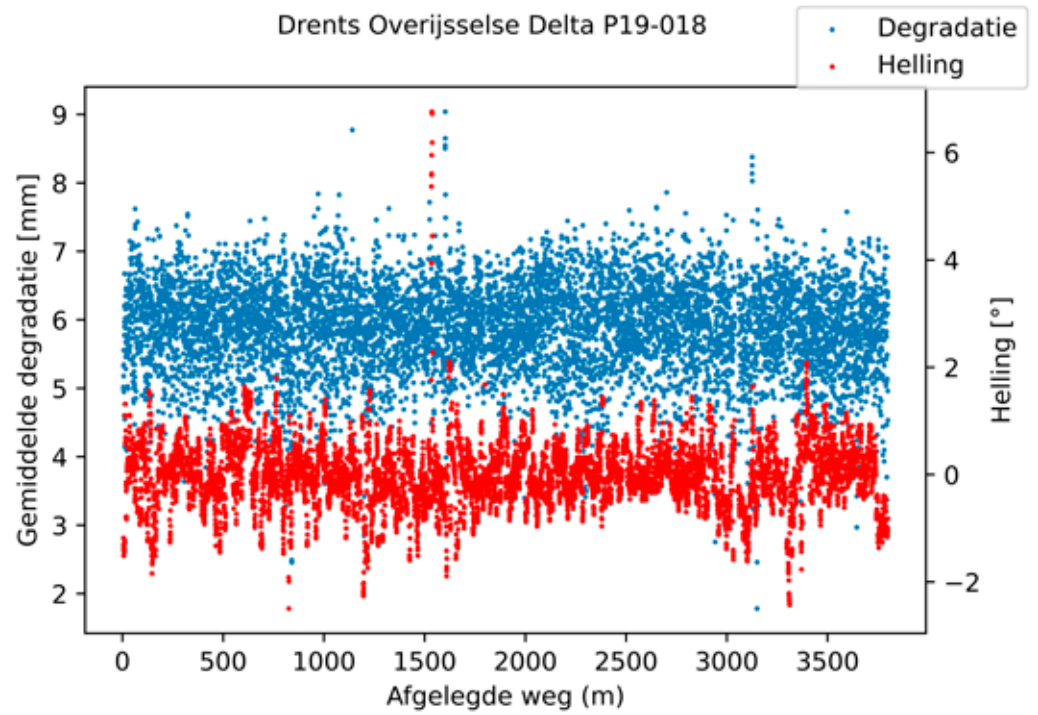
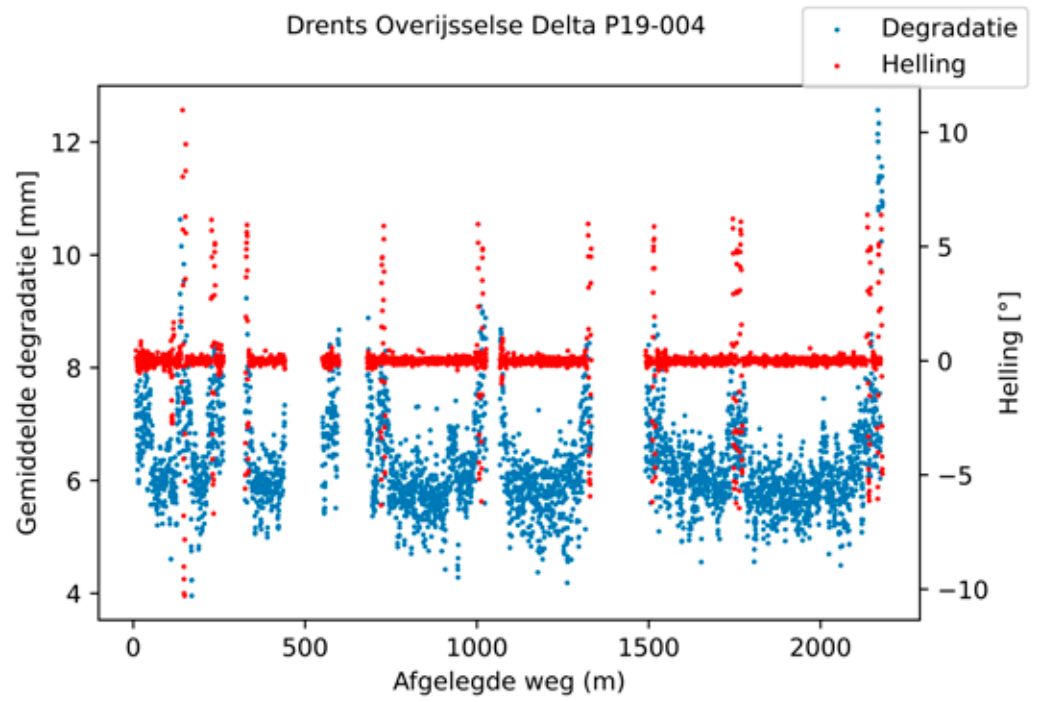


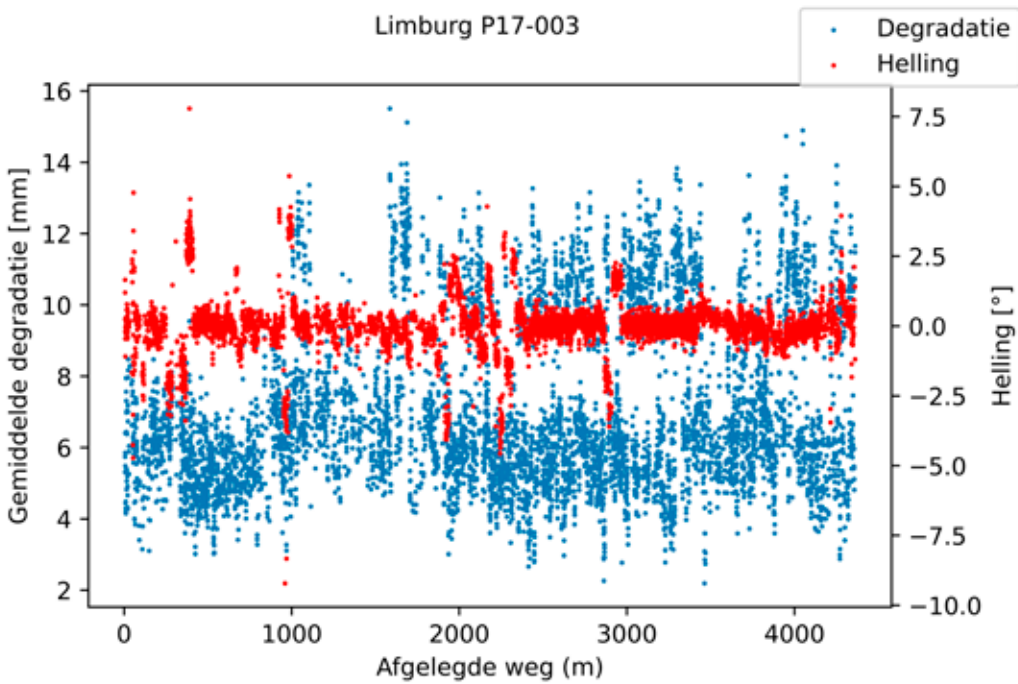
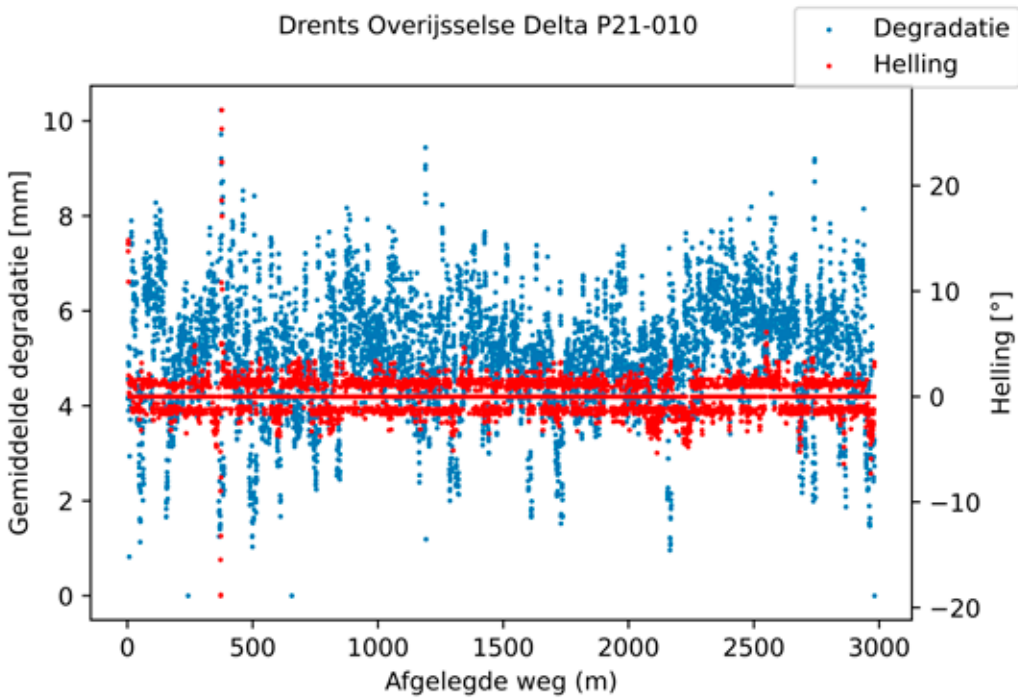


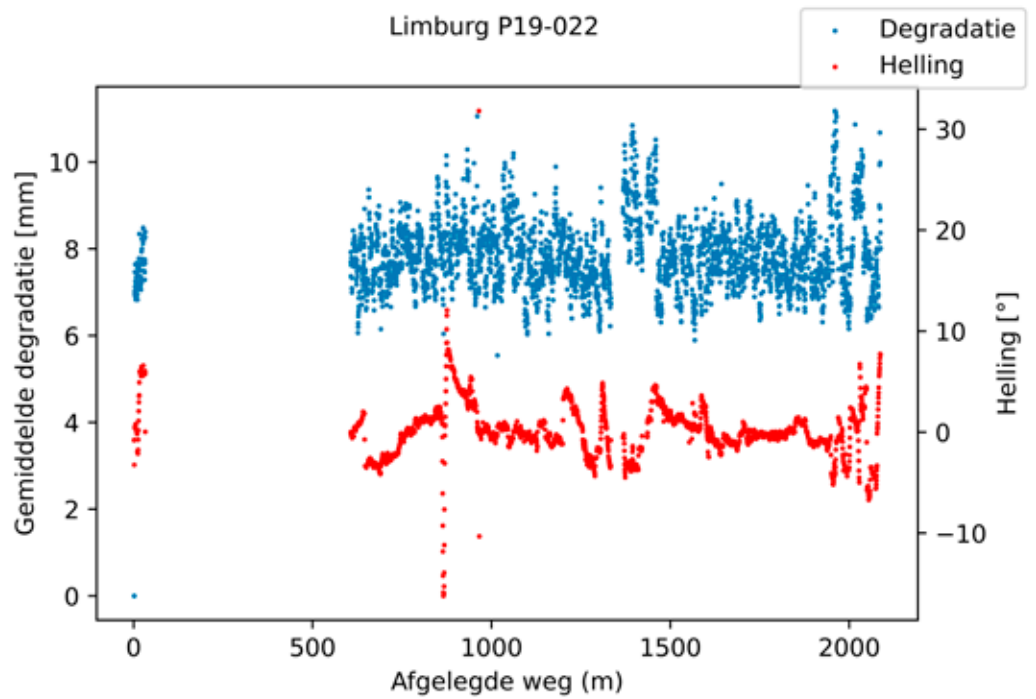
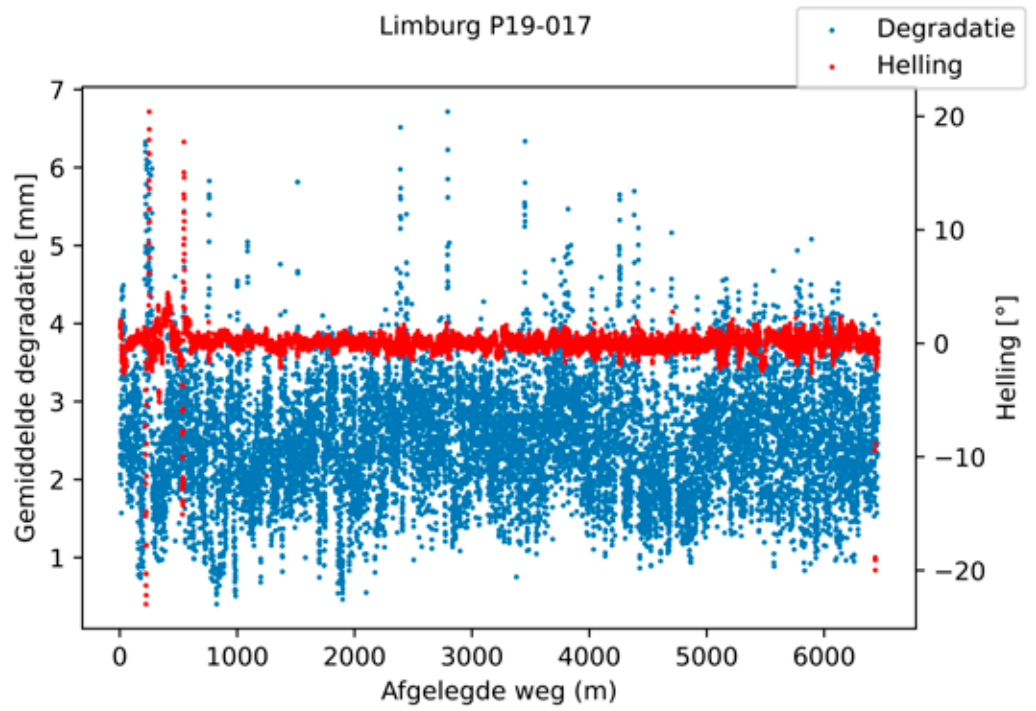


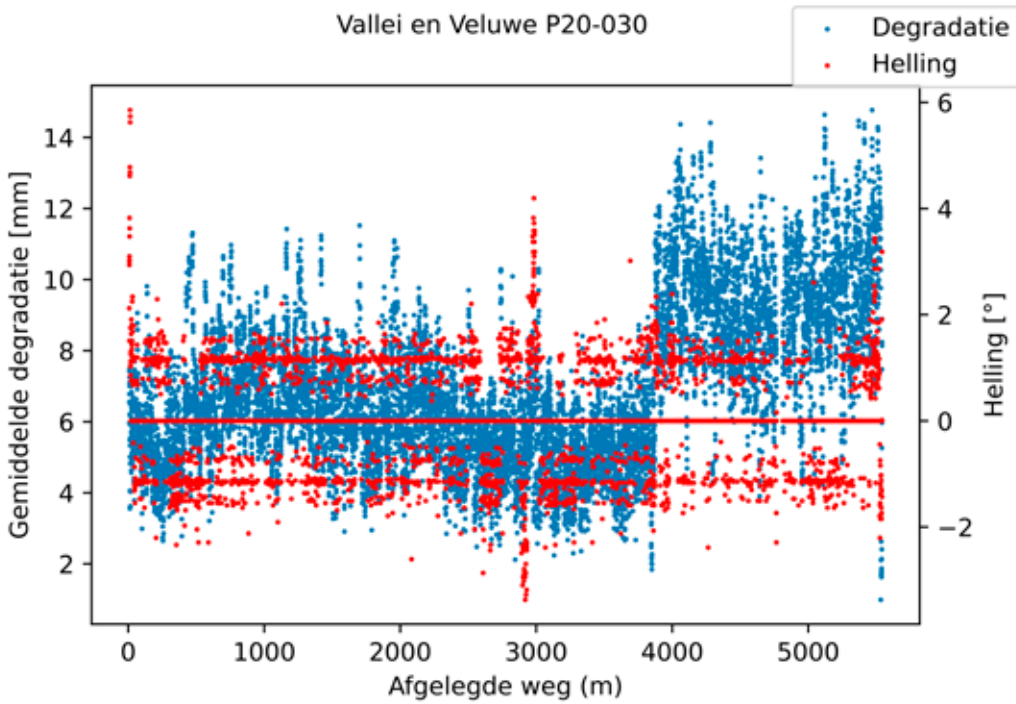
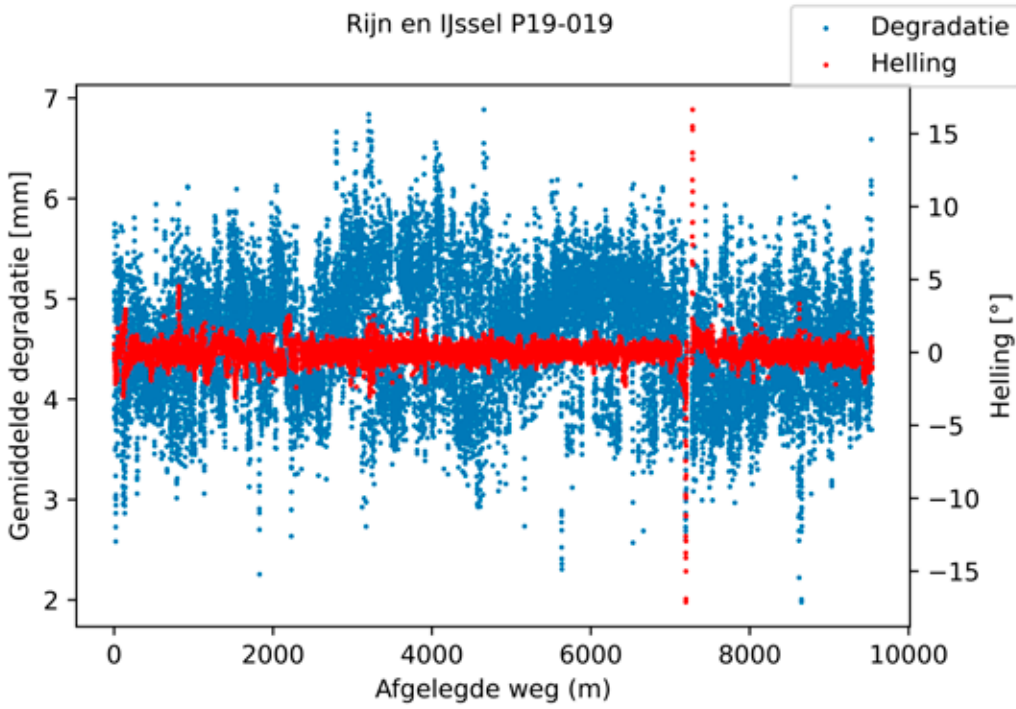


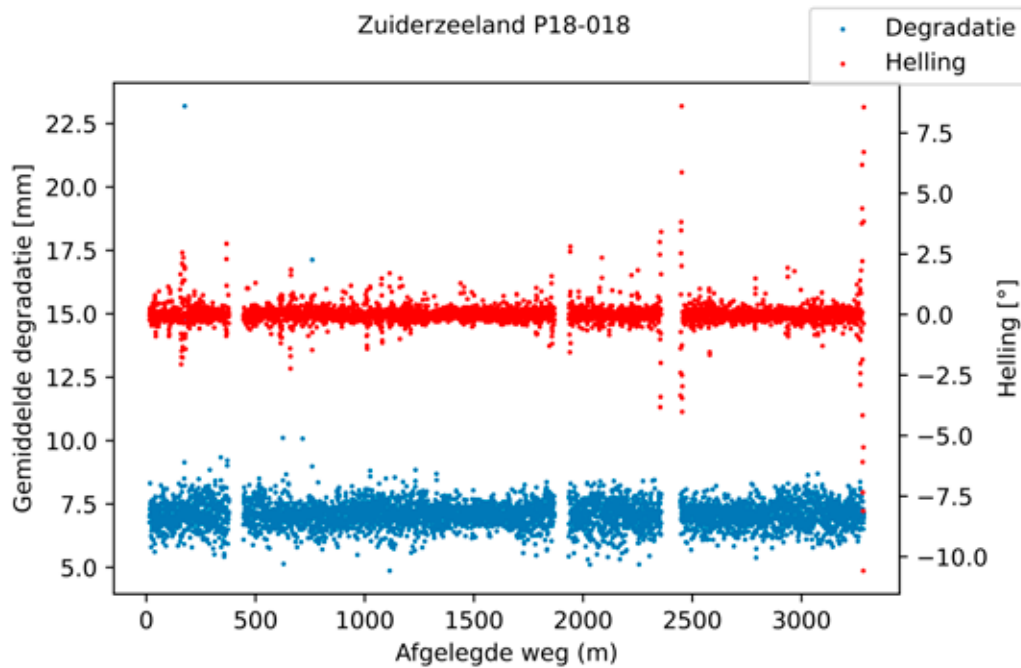
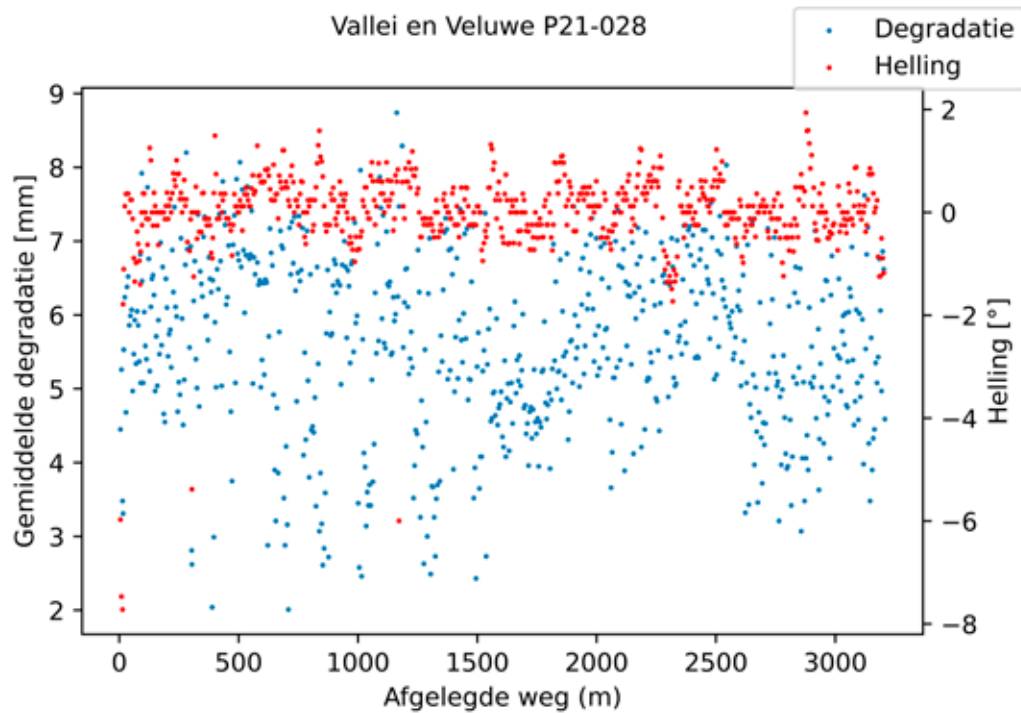




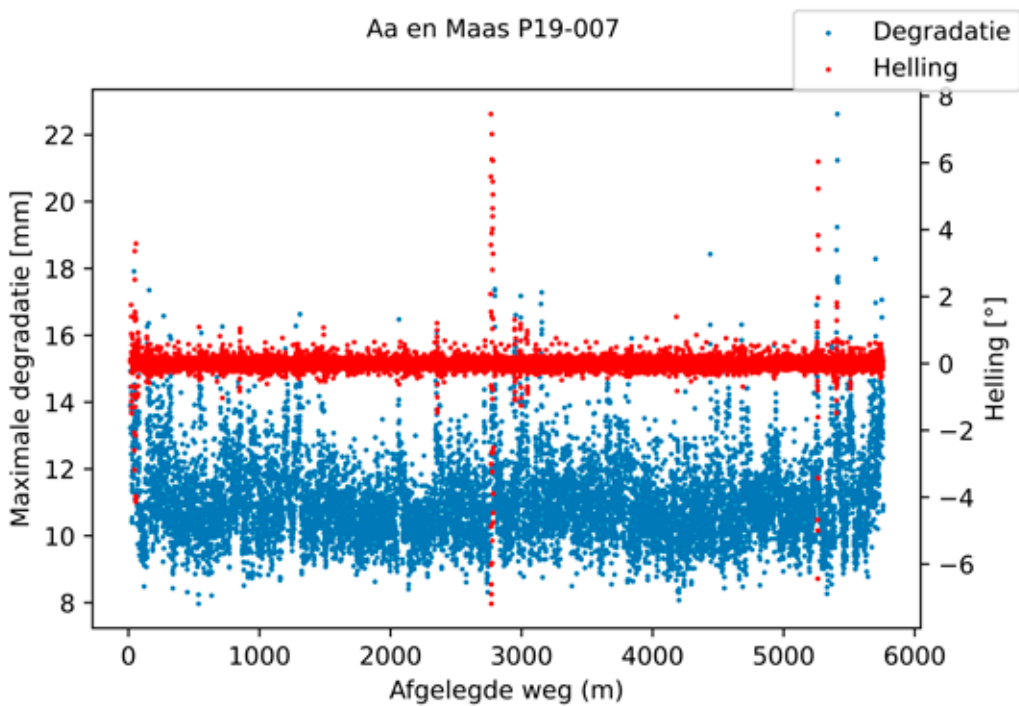
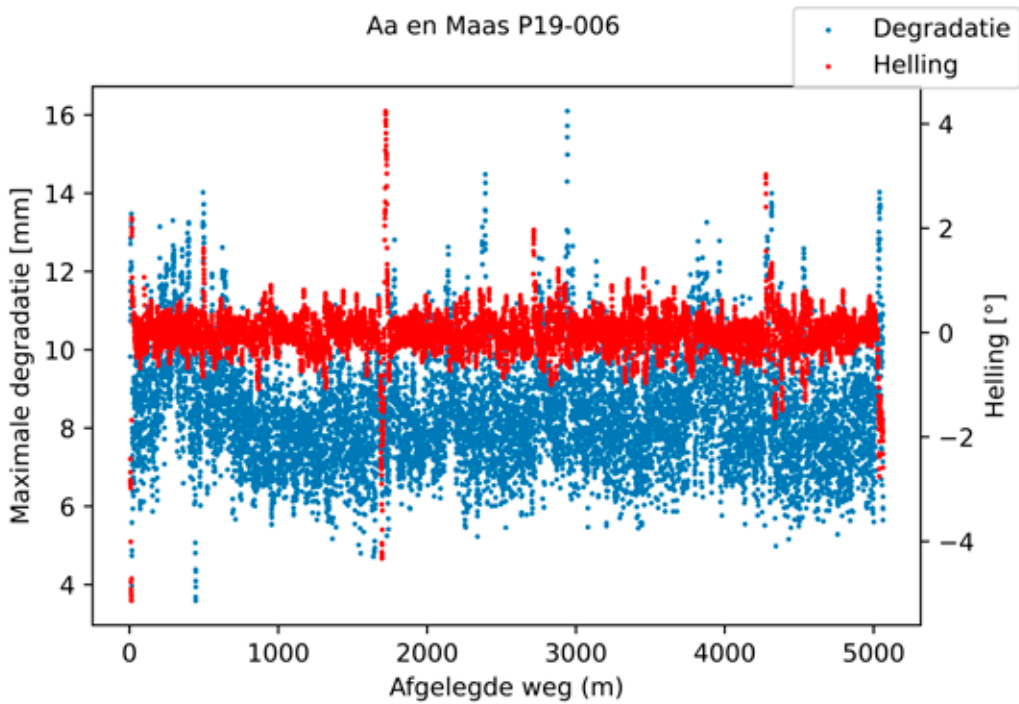


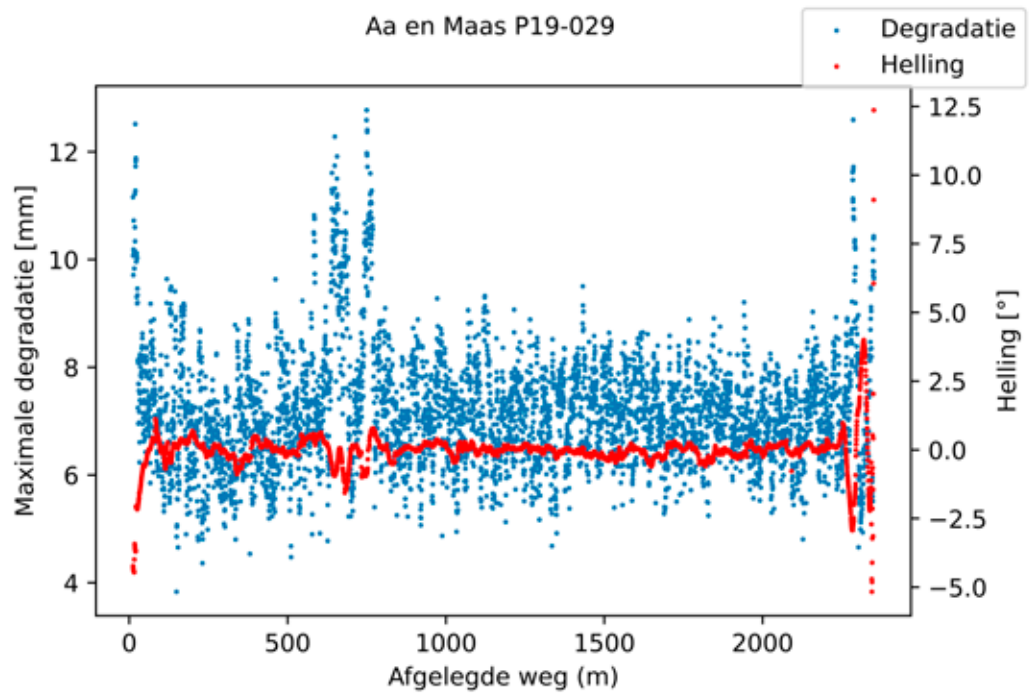
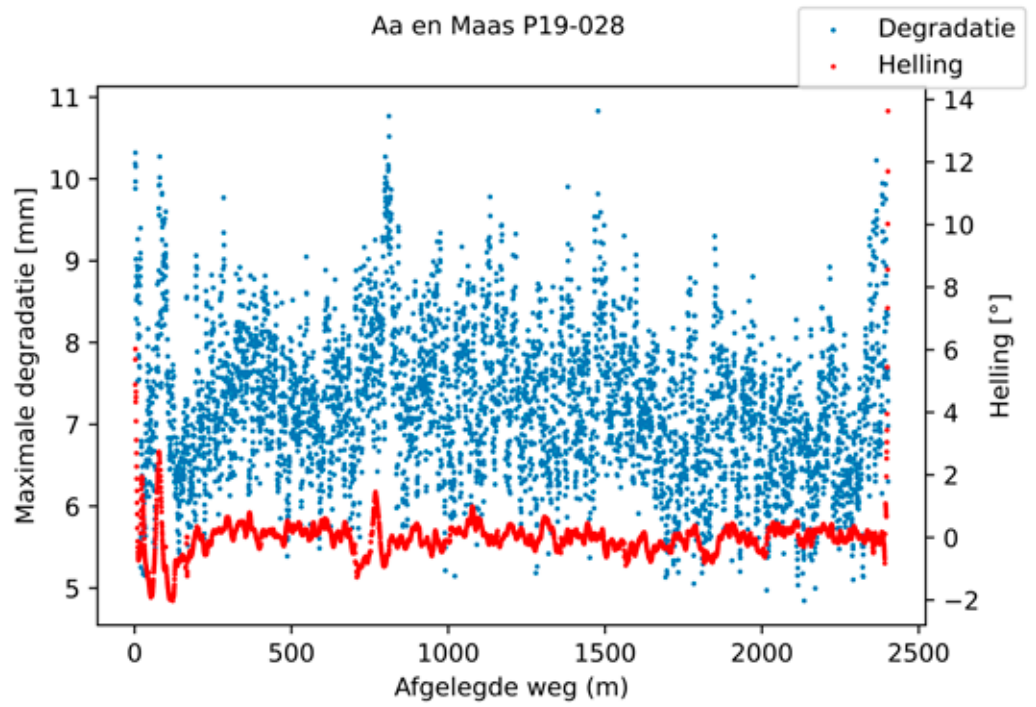


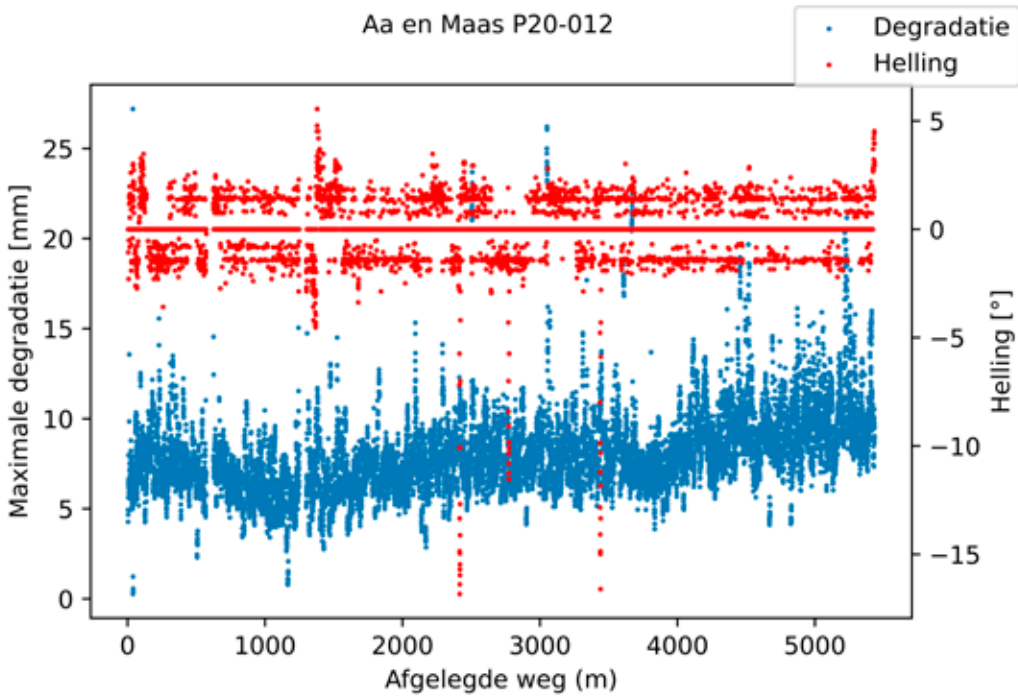
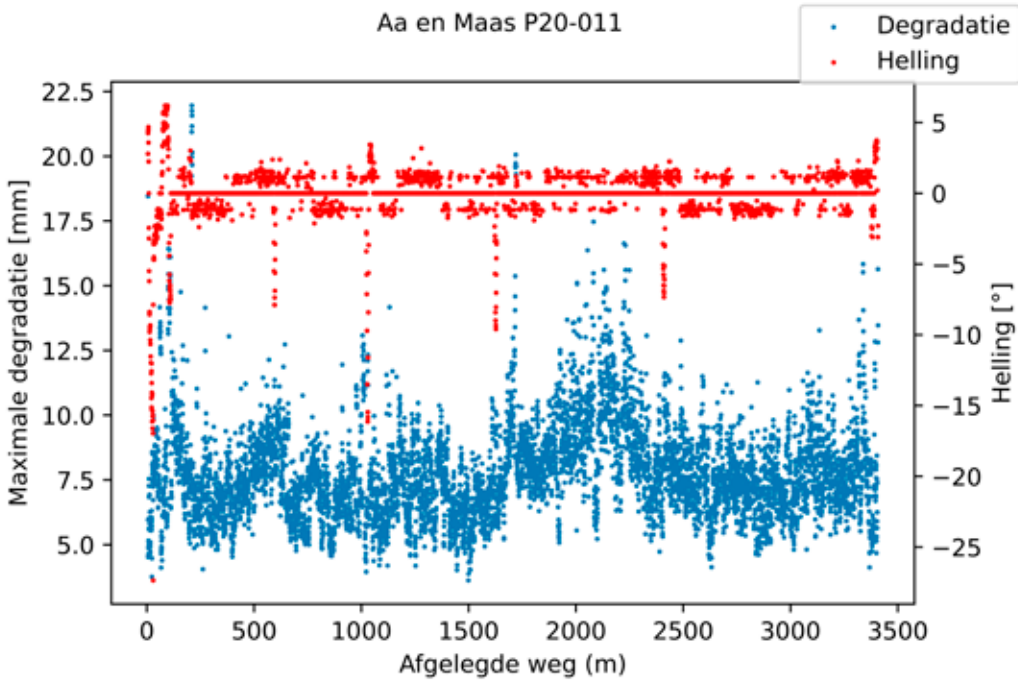


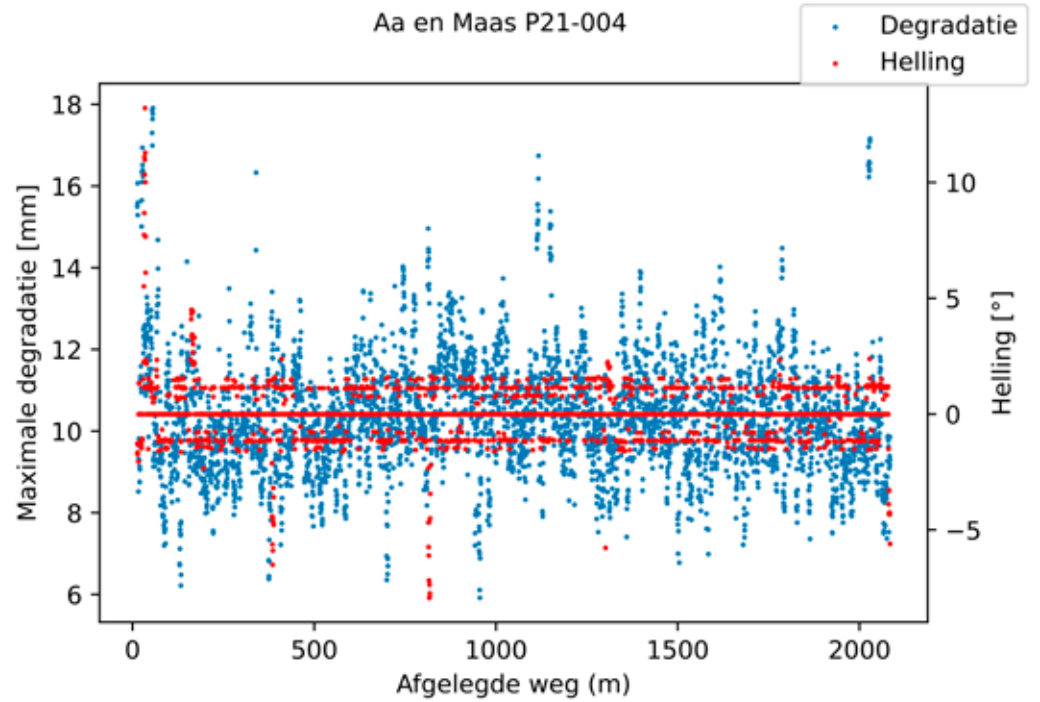
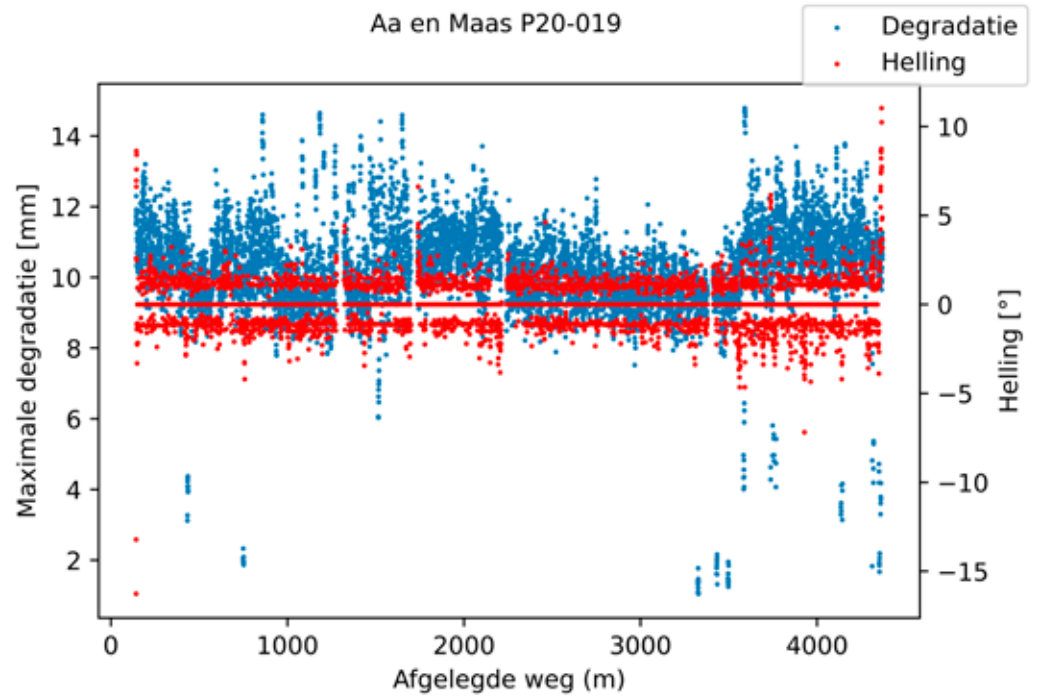


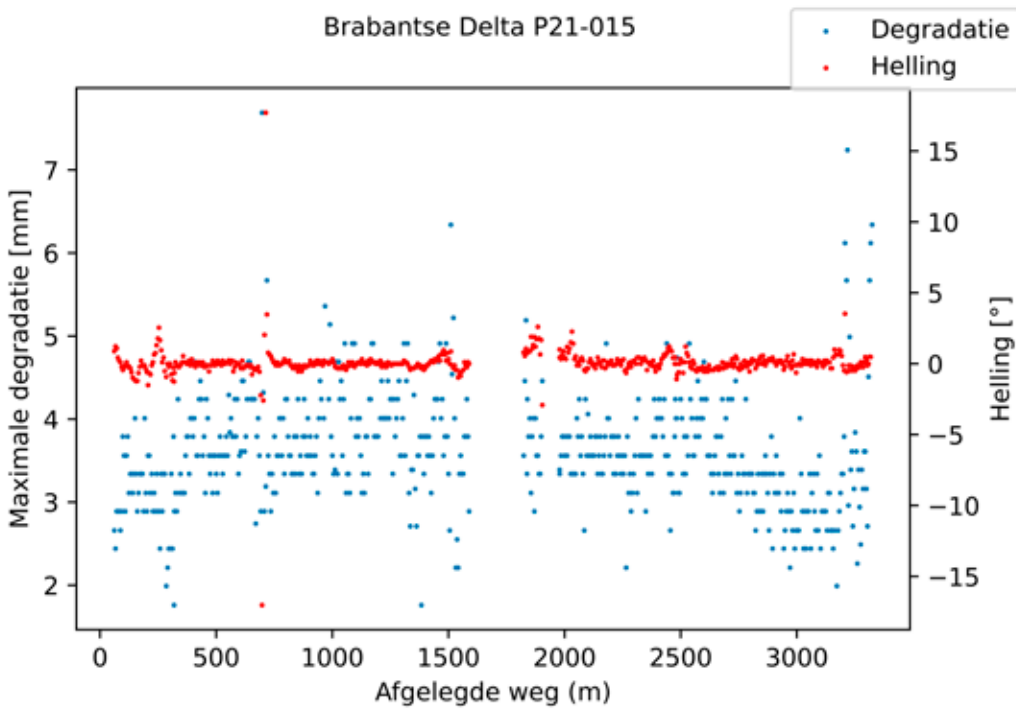
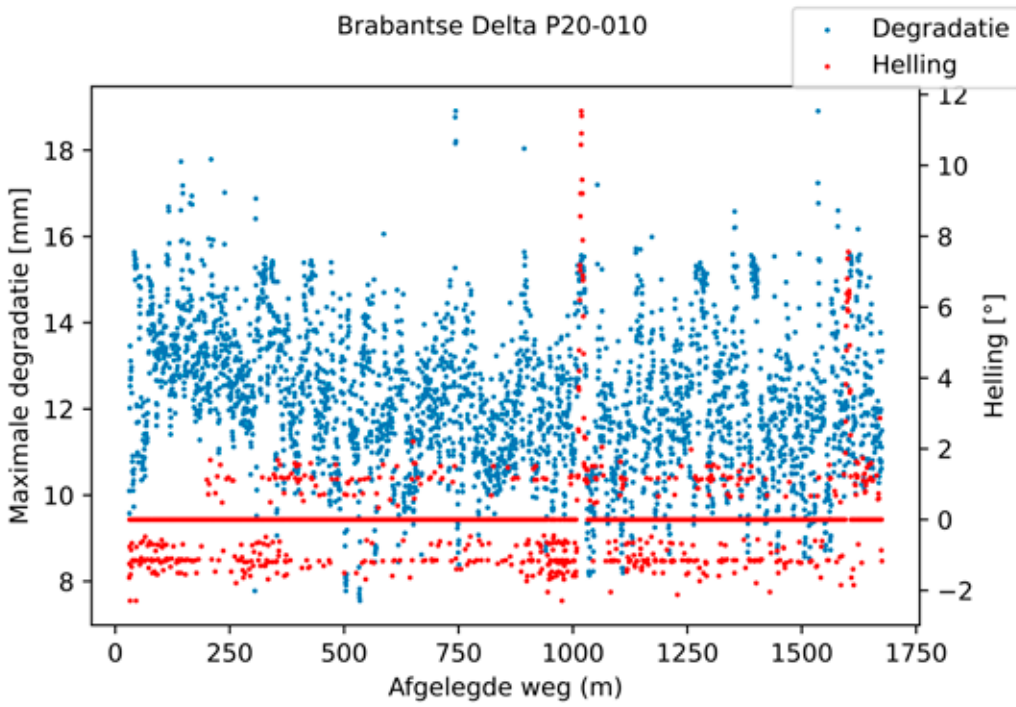
Bijlage 7 – Relatie tussen maximale degradatieprofiel en helling

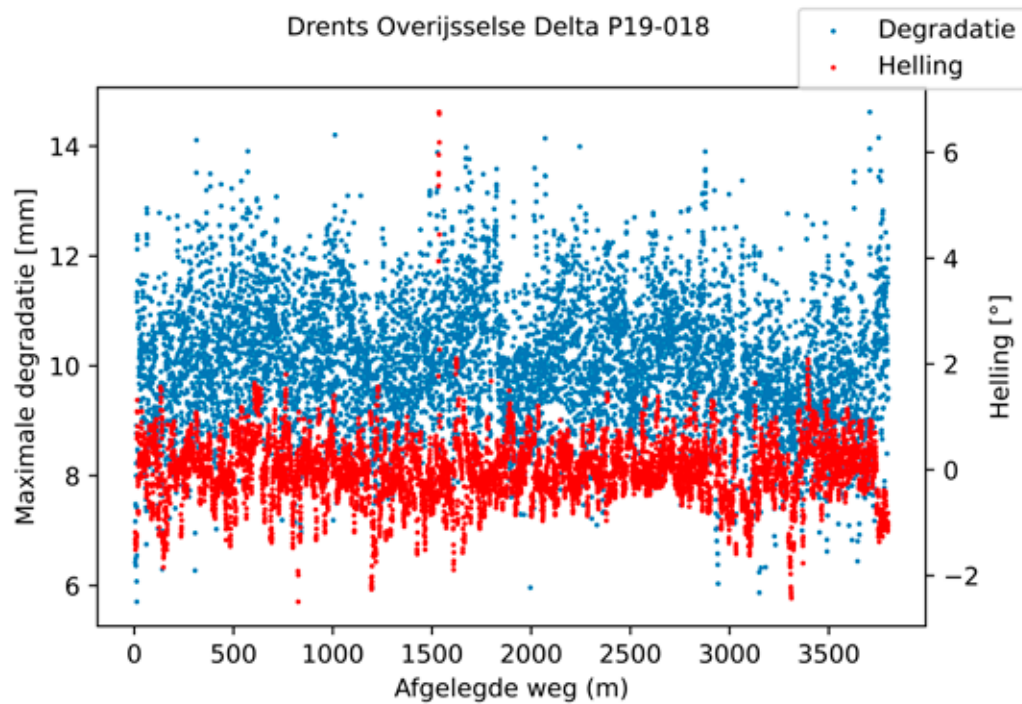
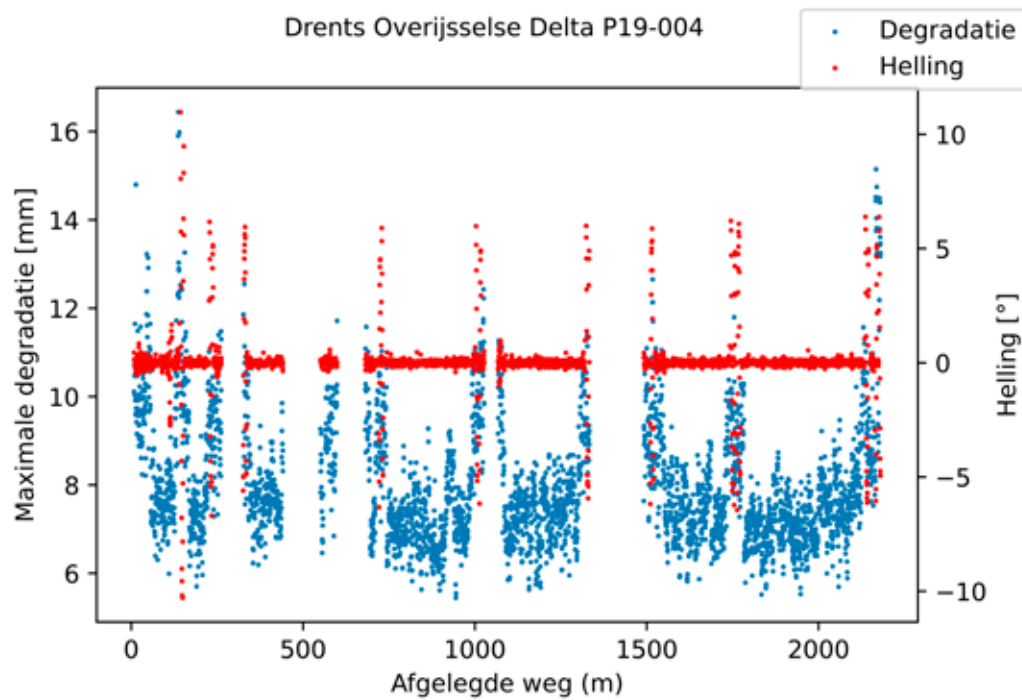


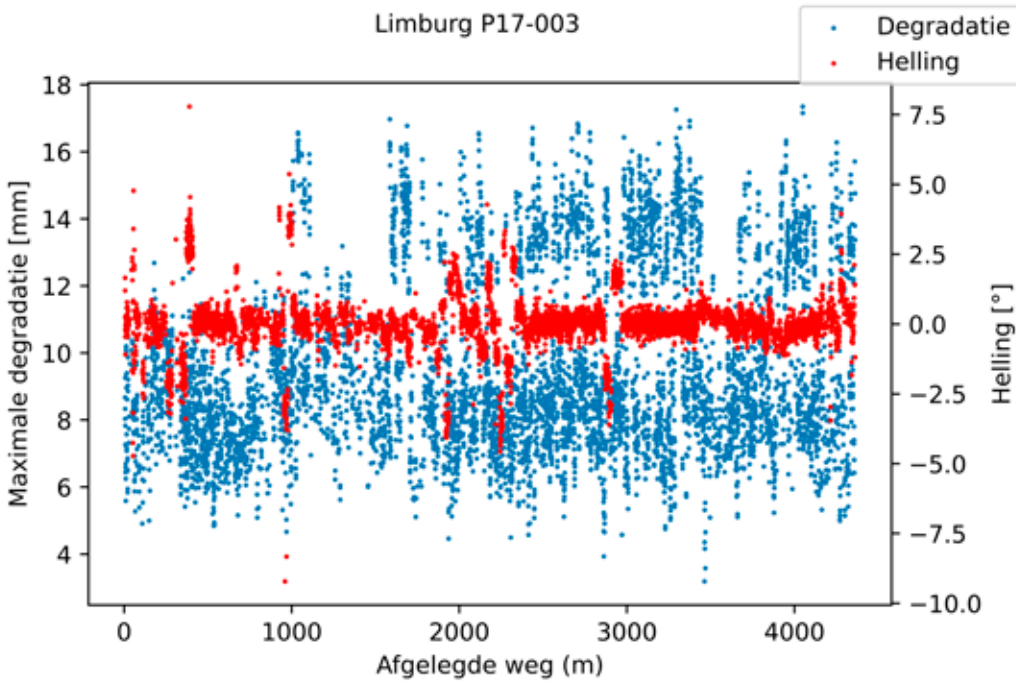
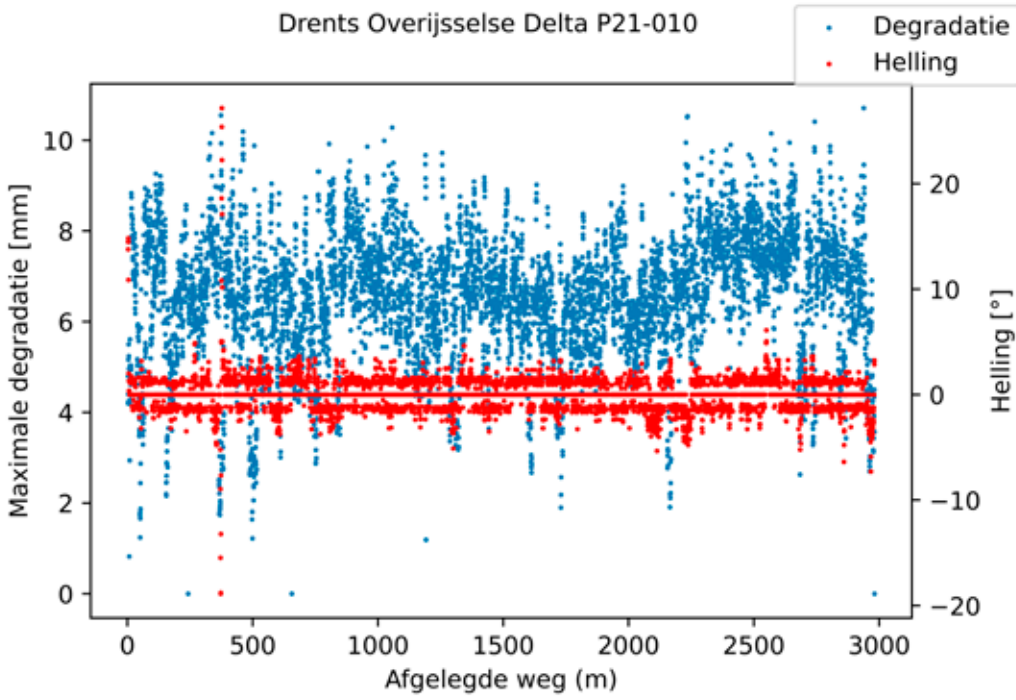


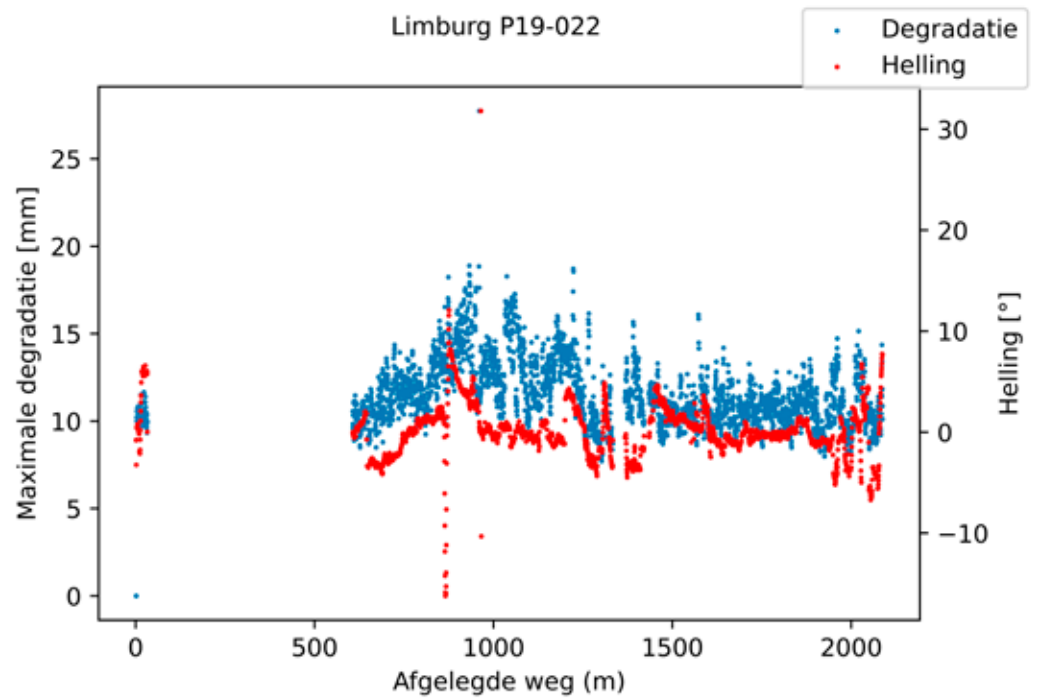
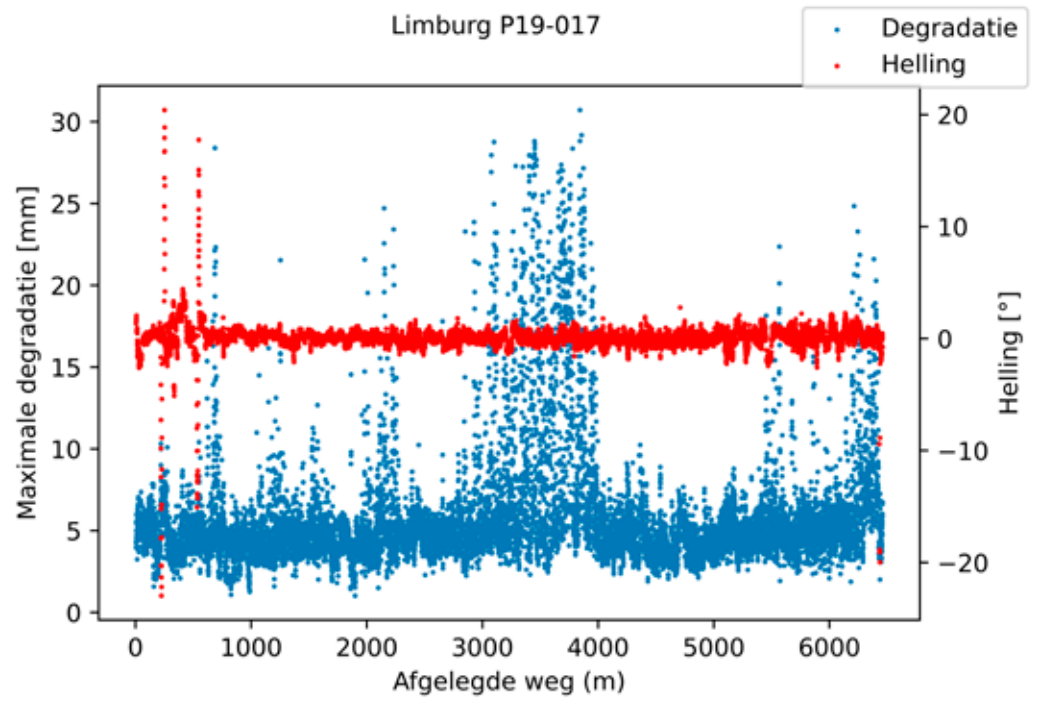


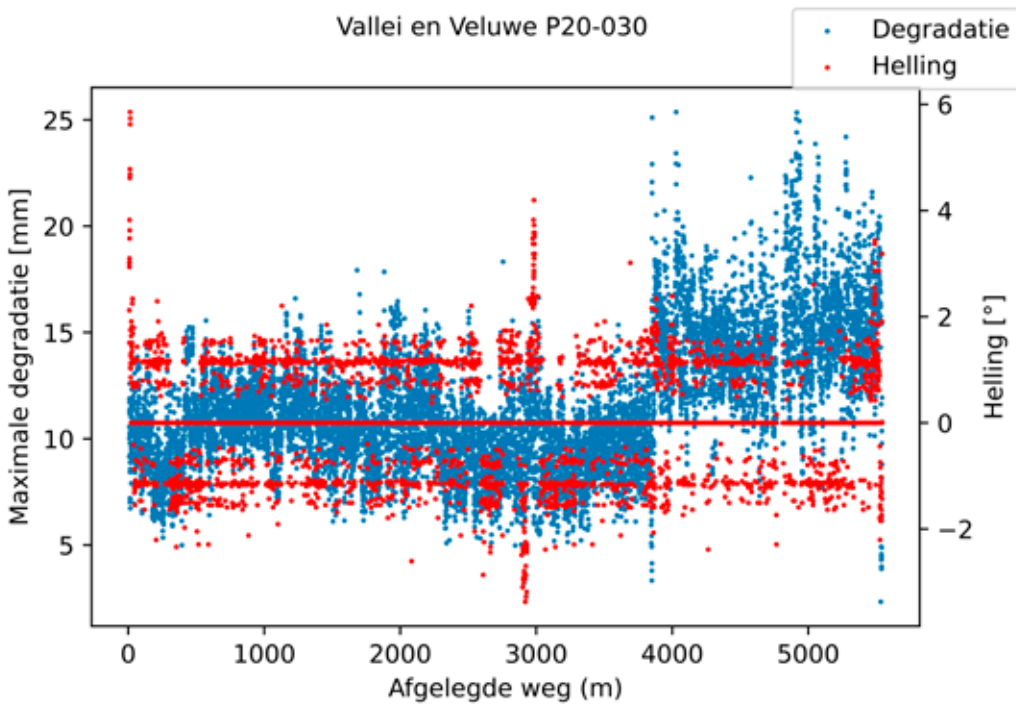
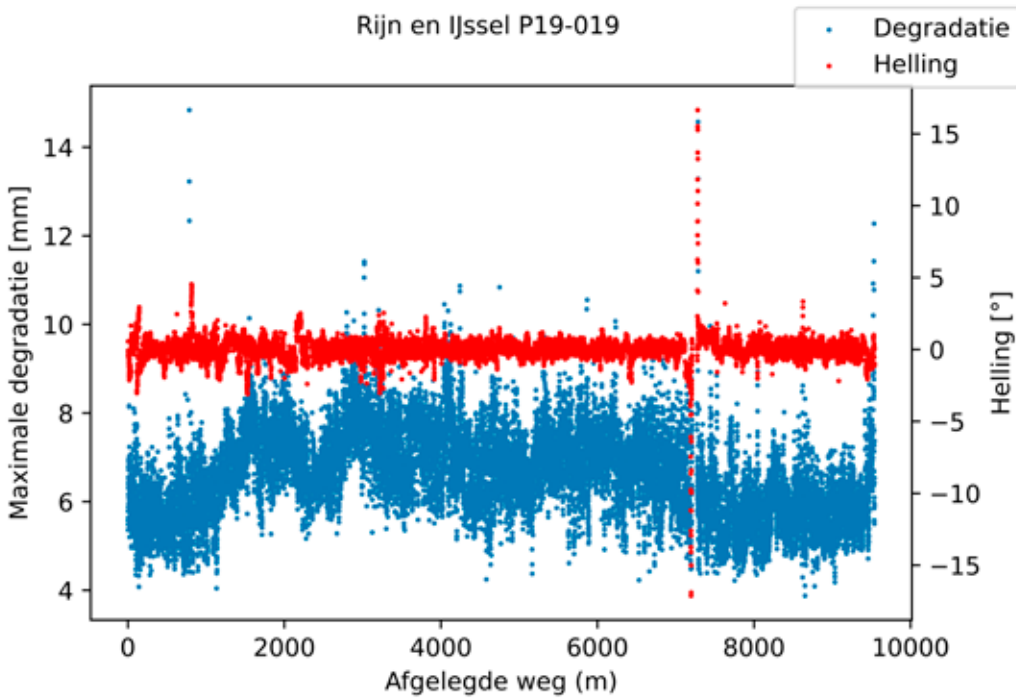


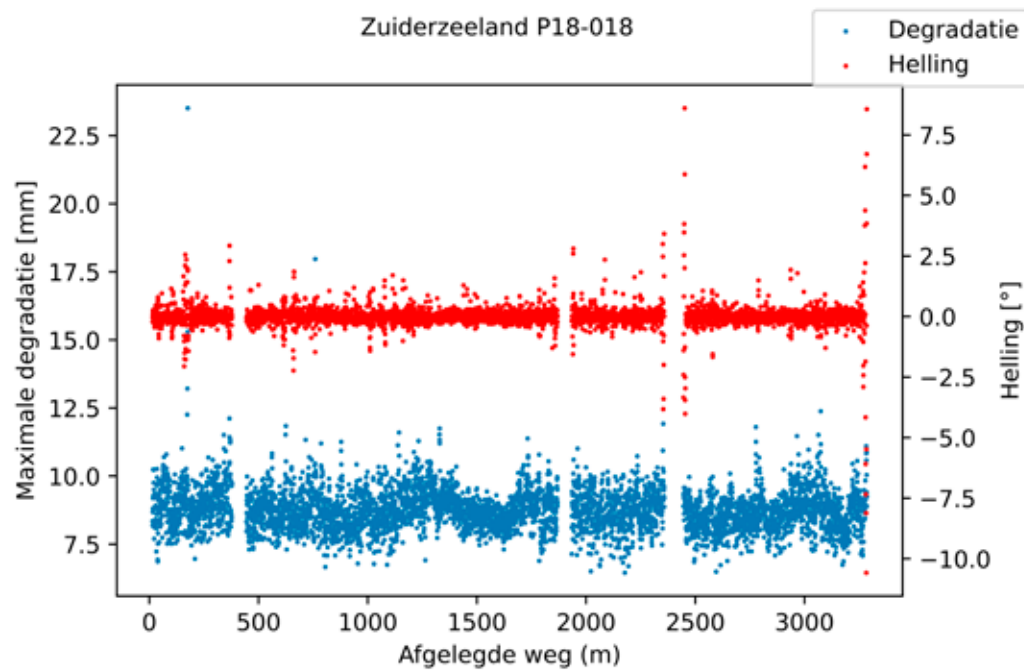
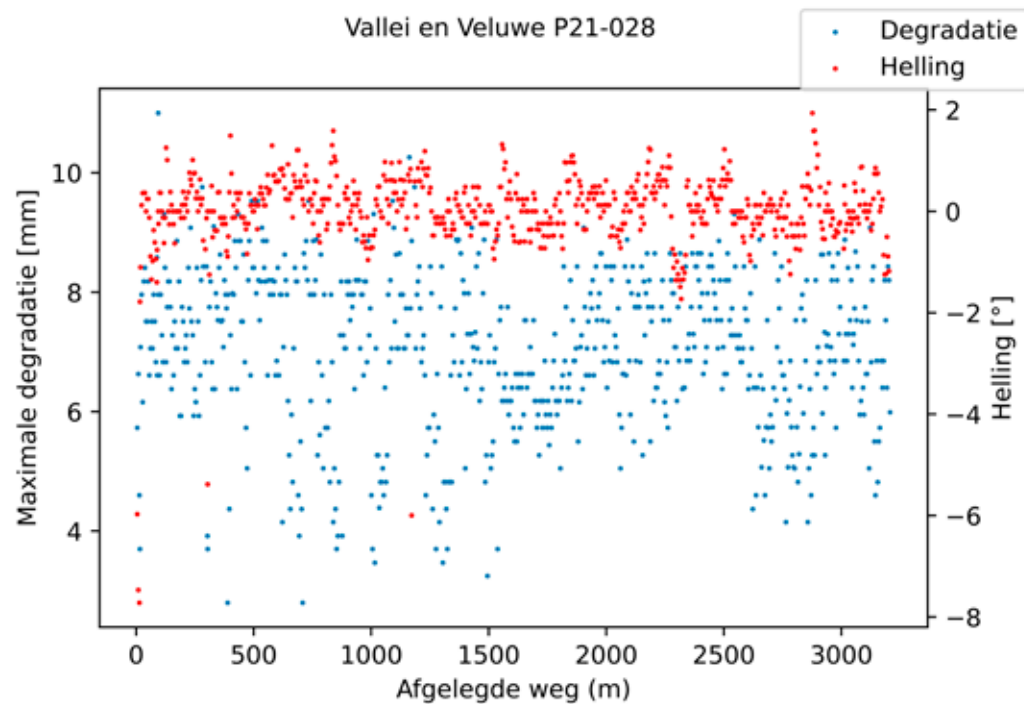












STOWA en Stichting RIONED in het kort

Stichting RIONED komt op voor het belang van goed stedelijk waterbeheer. De basis voor alles wat we doen is kennis. We doen onderzoek, we leggen vast, we leggen uit en we agenderen. Dat alles doen we samen met de mensen die het werk doen. We werken voor en met de vakwereld. Daarnaast informeren we het algemeen publiek over riolering en stedelijk waterbeheer.

STOWA is het kenniscentrum van de regionale waterbeheerders (veelal de waterschappen) in Nederland. STOWA ontwikkelt, vergaart, verspreidt en implementeert toegepaste kennis die de waterbeheerders nodig hebben om de opgaven waar zij in hun werk voor staan, goed uit te voeren. Deze kennis kan liggen op toegepast technisch, natuurwetenschappelijk, bestuurlijk-juridisch of sociaalwetenschappelijk gebied.

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Circa 1500 km afvalwater persleidingen zijn gemaakt van asbestcement. Deze persleidingen kunnen na verloop van tijd worden aangetast met verlies aan sterkte door uitloging van cement in de buiswand. De oorzaken voor en de snelheid van aantasting zijn echter nog onvoldoende bekend om hierop adequaat beheersmaatregelen te plannen. Het is van belang om de toestand van AC afvalwaterpersleidingen te kunnen voorspellen, zodat de slechtste leidingdelen het eerste worden vervangen. Het doel van dit onderzoek was om de belangrijkste degradatie-oorzaken van asbestcementen (AC) afvalwatertransportleidingen in beeld te brengen met een big data-analyse. De onderzoekers verzamelden grote hoeveelheden data van twintig jaar AC leidinginspecties en combineerden deze met data van leiding- en omgevingskenmerken.