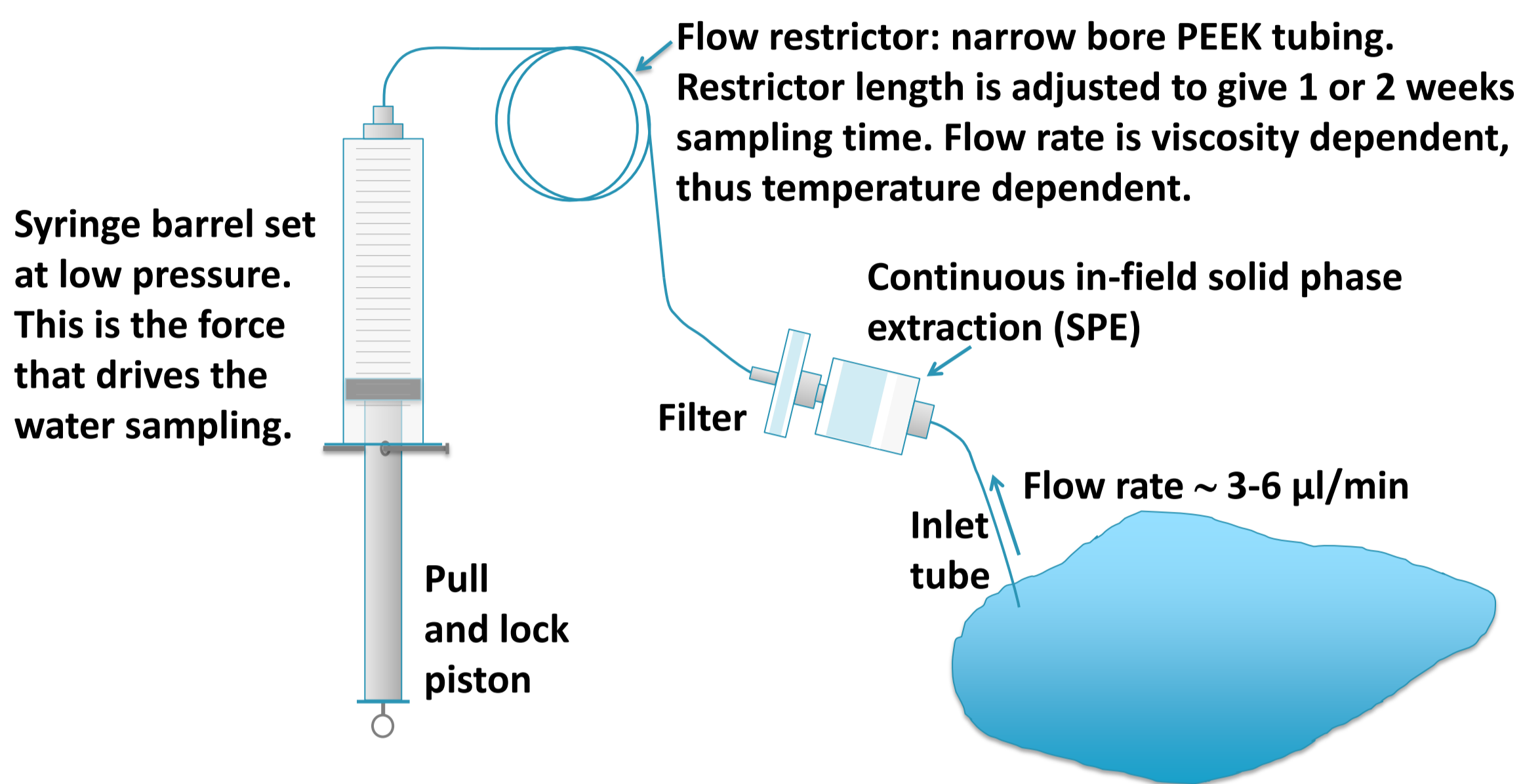


The TIMFIE sampler

– a new tool for time averaged, quantitative, determination of whole water pesticide concentrations

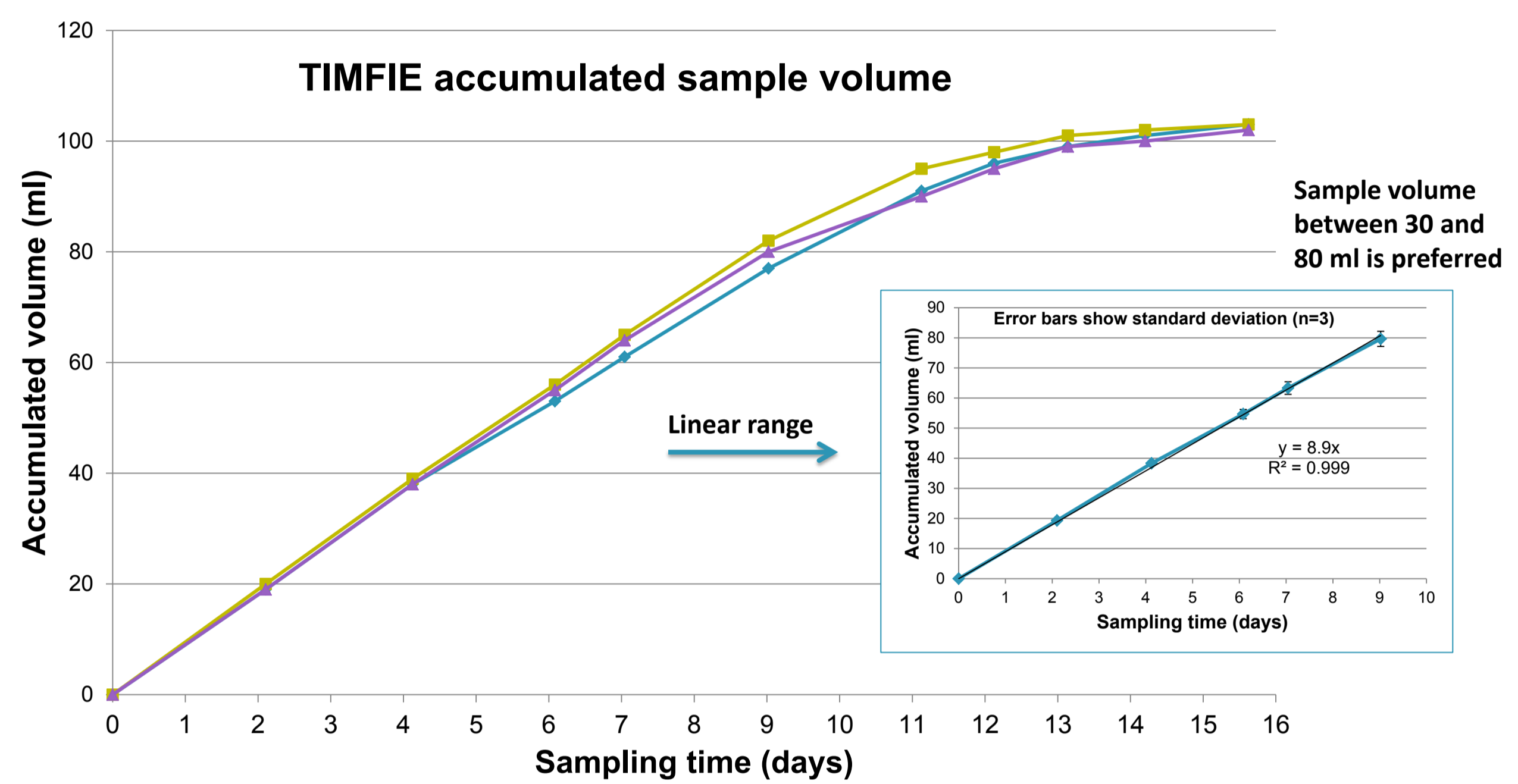
Time Integrating, Micro Flow, In-line Extraction (TIMFIE) sampler

TIMFIE principle



The TIMFIE sampler is assembled from inexpensive standard lab consumables

Time integrated sampling for 1-2 weeks



Exact sample volume Quantitative analysis

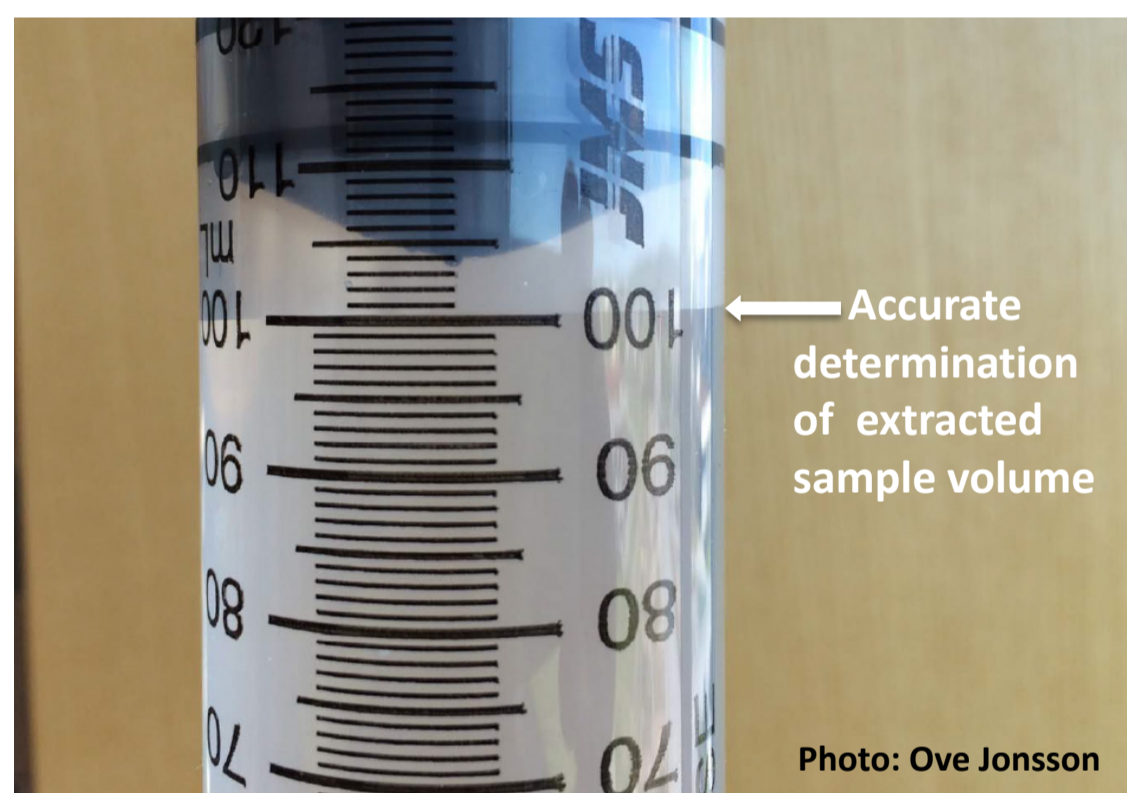


Photo: Ove Jonsson

Sample volume will vary between weeks and locations, but always be exact. Typical error in volume read is less than 2%.

Flexible extraction system

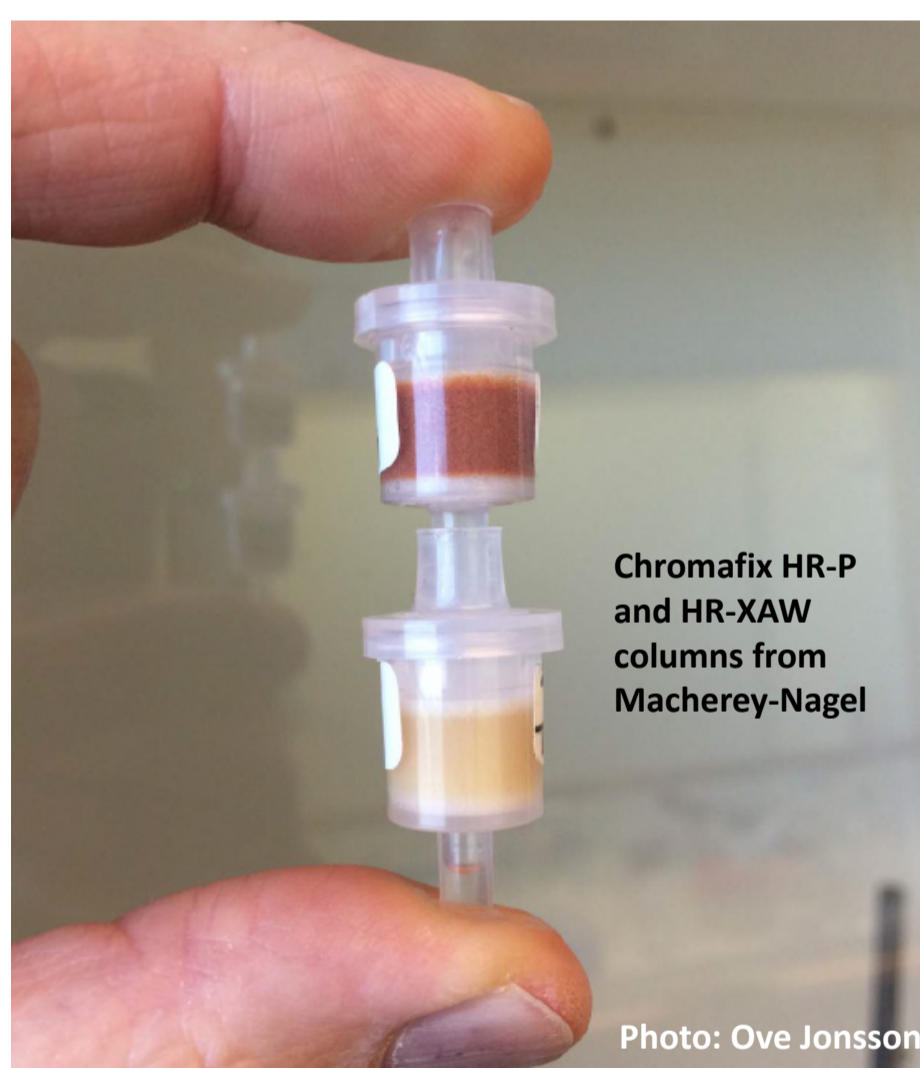


Photo: Ove Jonsson

- ✓ Traditional solid phase extraction
- ✓ Method development and validation according to established procedures
- ✓ Small format in closed flow system
- ✓ Stack cartridges in series to extract different compound classes
- ✓ Minimized solvent consumption
- ✓ Simple, inexpensive shipping and storage
- ✓ Rational internal standard (IS) addition

Low-tech, low cost

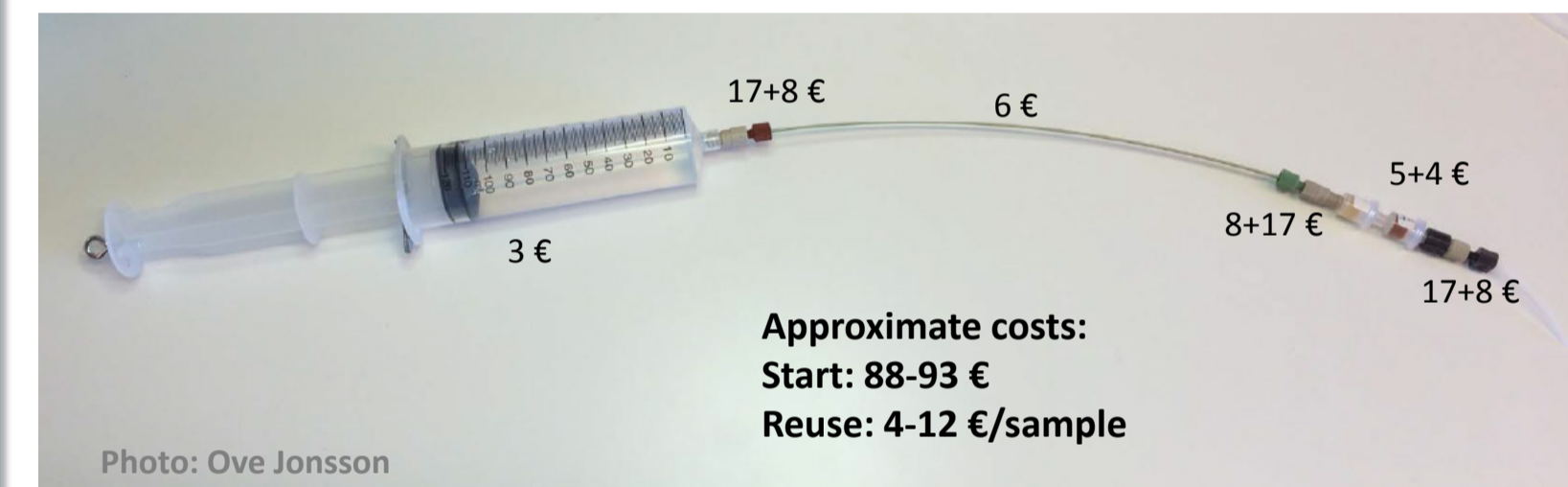


Photo: Ove Jonsson

Field application, example



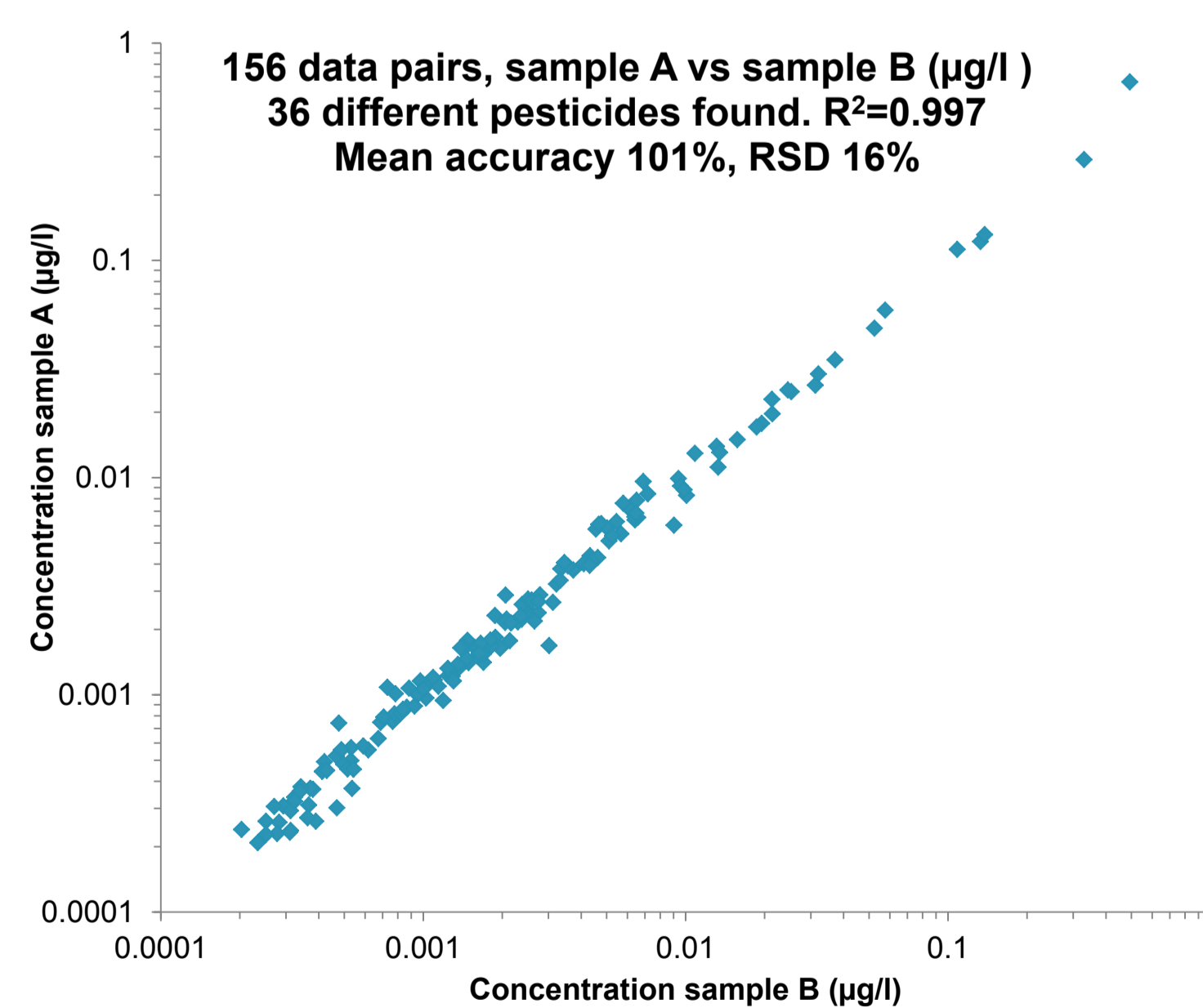
Two TIMFIE samplers mounted on aluminium stick. Photos: Roland Persson

Method and validation

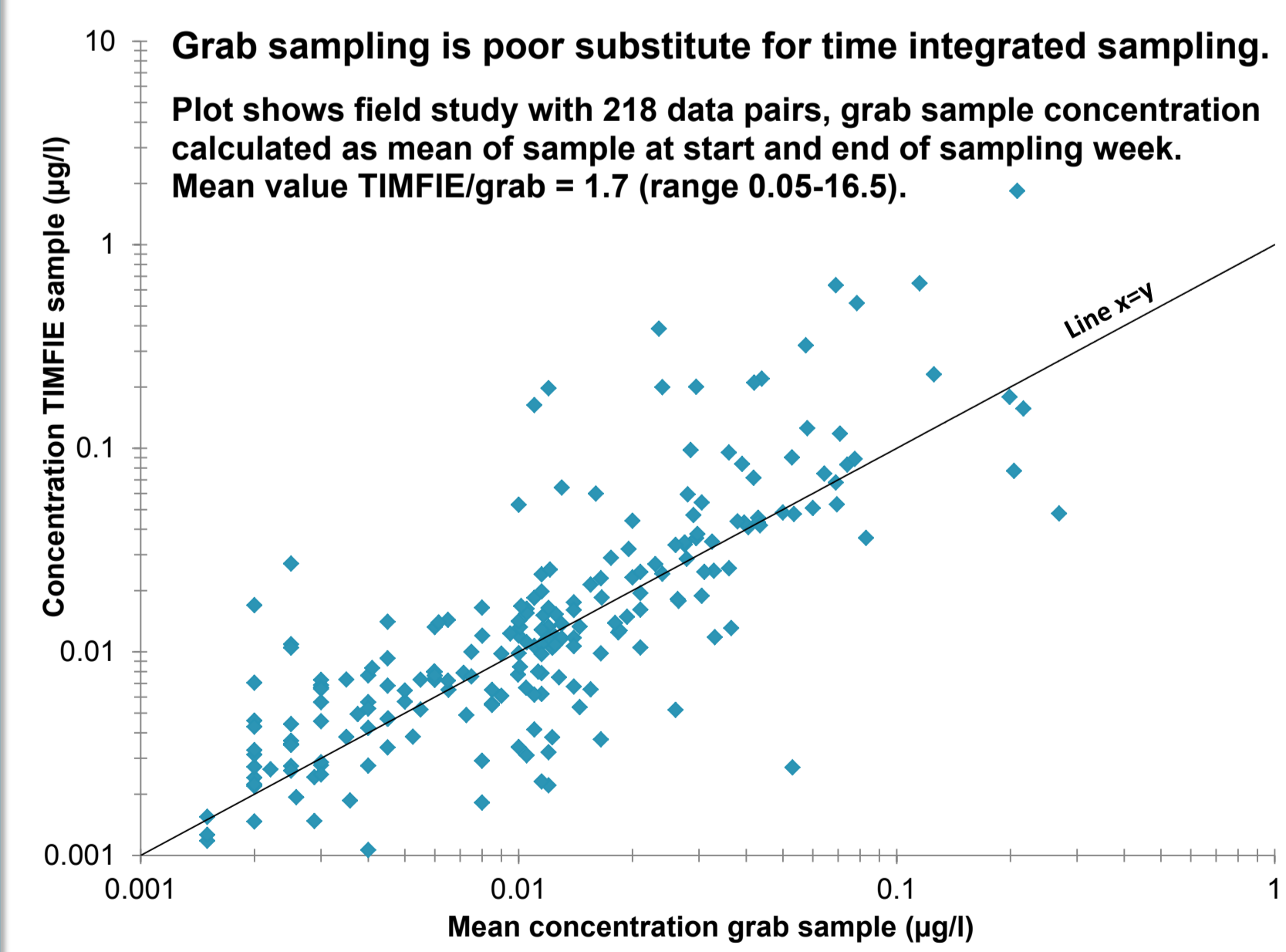
- Pesticide recoveries determined from spiking in several different natural waters, at different concentrations
- 72 pesticides currently validated with LC-MS/MS
- Field validation comparing TIMFIE with ISCO sampling ongoing
- Sample prep: IS addition > wash > dry > elute with MeOH and acetone > evaporate > reconstitute in buffer > LC-MS/MS
- IS mixed with water in SPE cartridge void volume, interact with matrix components
- Methods based on minimum 30 ml sample volume
- LOD's and LOQ's typically 10 times lower than routine method¹
- Approximately twice the number of pesticides detected with TIMFIE sampling compared to routine method¹

¹ Jansson C. and Kreuger J., J. AOAC Int., 2010, Vol 93, No 6, P 1732

Duplicate field sampling



TIMFIE vs grab sampling



Summary

- TIMFIE is an "active" and quantitative new sampling technique.
- It can be adjusted to enable time averaged sampling for up to two weeks.
- A well known sample volume is pumped through a closed SPE system with accurately validated analyte recoveries.
- Whole water concentrations of a range of pesticides are determined.

TIMFIE sampling should NOT be mixed up with passive sampling techniques!