

WaterBackpack “PAUL®” for **disasters** and for **permanent water supply**

hydraulic capacity: results from
measurement in real world usage

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Franz-Bernd Frechen, IWA Fellow

Chair, IWA Specialist Group „Membrane Technology“
2014-2017

Chair, DWA Committee on „Membrane Bioreactors“

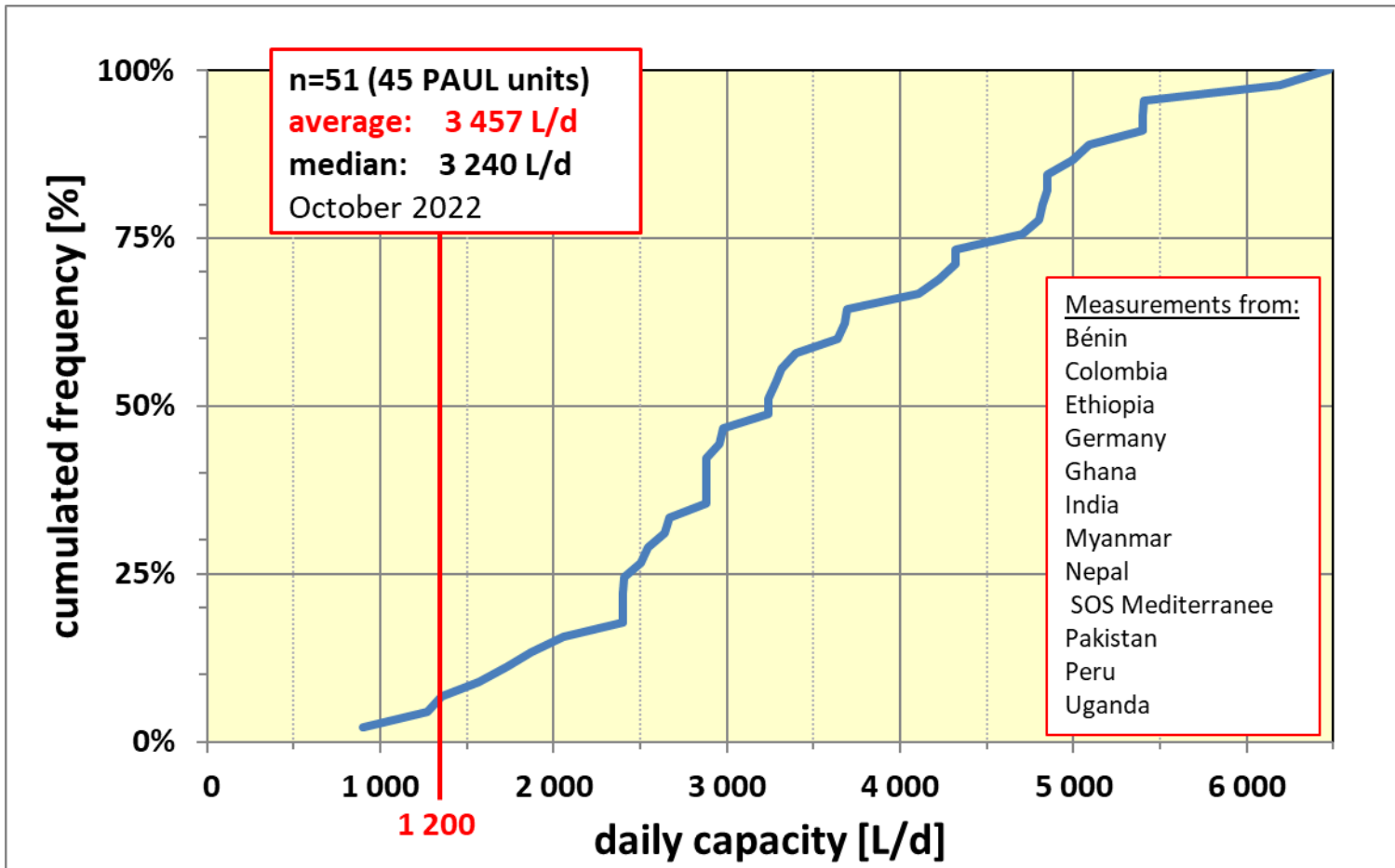


timeline of PAUL development

- ➔ 2001: started tests
- ➔ 2002: first appearance in a television broadcast in Germany
- ➔ 2005:
Frechen & Waldhoff:
Water supply from surface waters with a small gravity flow membrane filtration unit for use in cases of disasters
IWA Specialty Conference “Wastewater Reclamation & Reuse for Sustainability (WRRS 2005)”, Nov. 8-11.2005, Jeju, Korea
- ➔ 2006: sample **PAUL** unit presented
- ➔ ... many presentations (but unfortunately not enough publications)
- ➔ 2010: **NGOs start distribution** of **PAUL** for emergencies
- ➔ 2013: creating the acronym “**ULP-UF**” for **Ultra Low Pressure Ultrafiltration**
- ➔ 2013: explaining **cake layer control** at the 7th IWA-MTC in Toronto
- ➔ 2014: beginning of usage for **permanent supply**: “**PAUL station**”
- ➔ 2022: **4,000+** units in **90** countries, **800+** for permanent supply

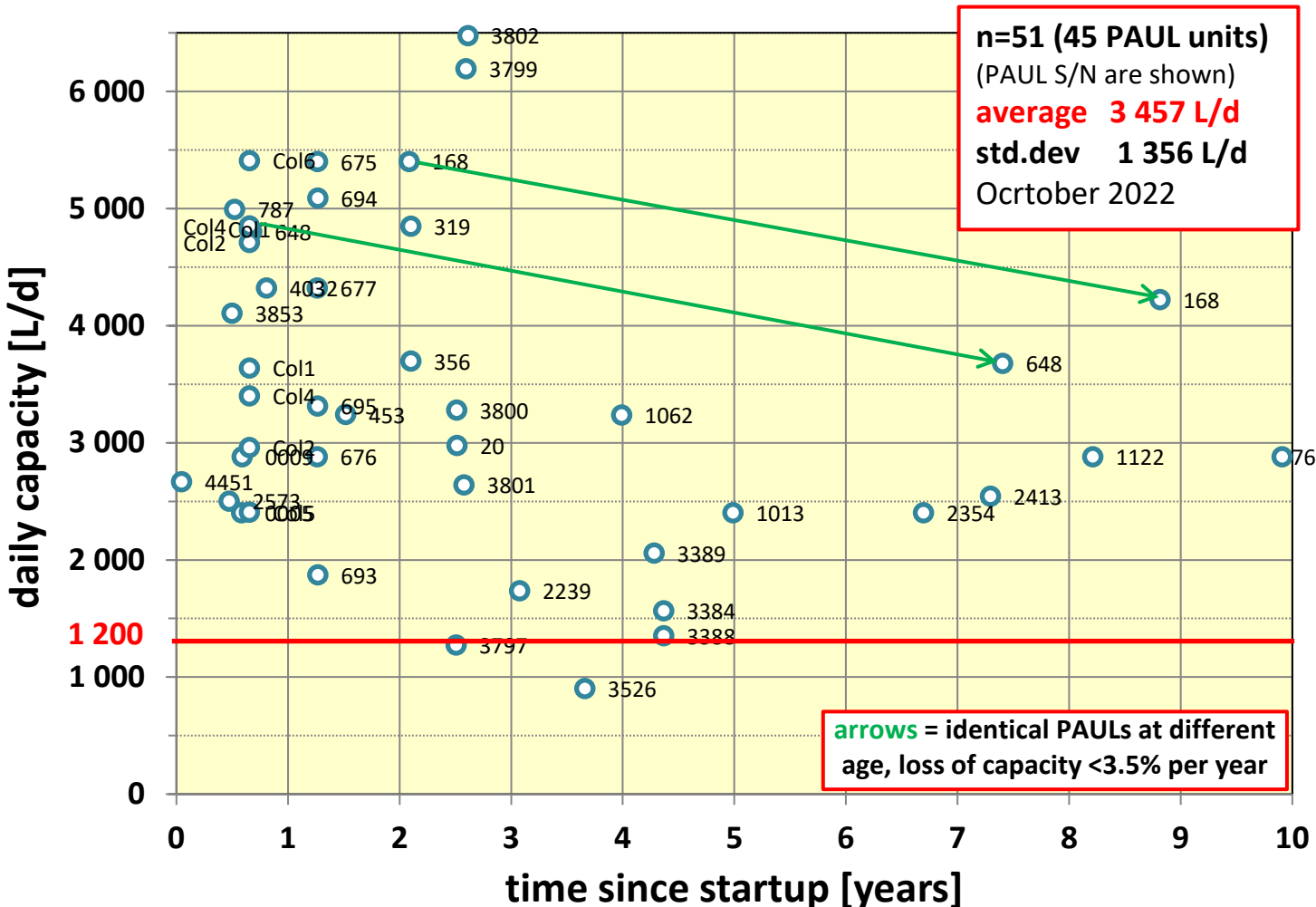
- ➔ **The minimum capacity is nominal 1,200 Liter per day. Measurement in real usage conditions, however, show higher values as explained in this presentation**





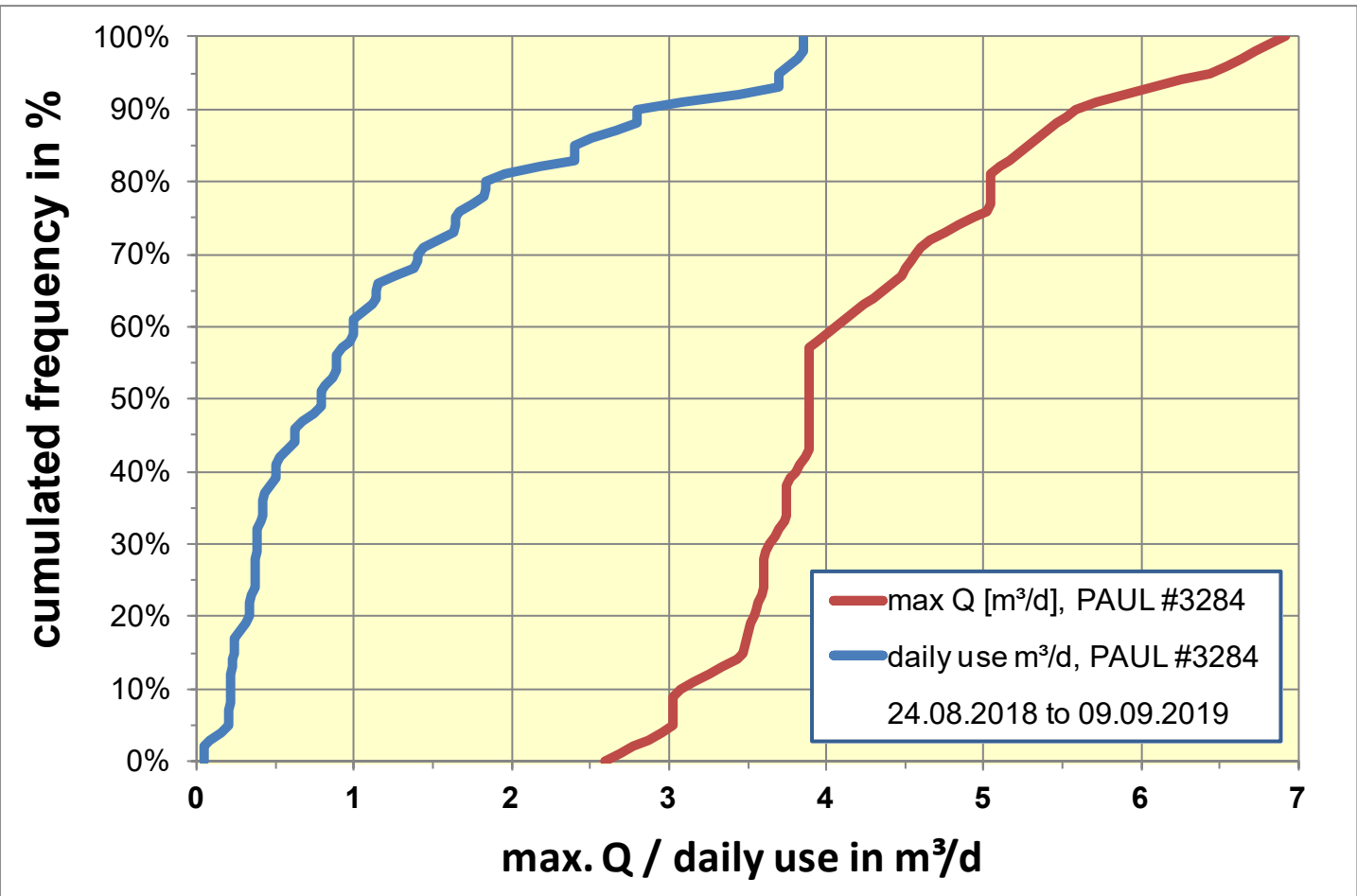
Data source: University of Kassel (sponsored by DBU); private measurement, see last slide





Data source: University of Kassel (sponsored by DBU); private measurement, see last slide





Data source: private measurement by Mrs. Duangkaew Tawee (Thailand)



Credits and awards

PAUL® was developed at the

U N I K A S S E L
V E R S I T Ä T

Research was sponsored by



www.dbu.de

Data presented in this document originate from DBU-sponsored research projects (2006 to 2014) at the University of Kassel and from subsequent research work by **The WaterBackpack Company**



The
WaterBackpack
Company GmbH
www.waterbackpack.org

Additional data were contributed by

- Mr. Stefan Koscheny (Ethiopia)
- Mrs. Duangkaew Tawee (Thailand)
- Ms. Brandl (Peru)
- Mr. Andres (Ghana)
- SOS Mediterranee (onboard ship)

Selected awards won by **PAUL®**



Winner 2011 in the category „society“



2019 Melvin Jones Fellow

