



Intercomparison 2008

whole body dosimeters

Overview

preliminary results

Andrew McWhan, VT Nuclear Services, UK
Tom Grimbergen, NRG, NL (Coordinator)
Markus Figel, Helmholtz-Zentrum Muenchen, D
Ana M. Romero Ciemat, E
Hannes Stadmann, ARCS, AT

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EURADOS →

Definitions



response R :

$$R = \frac{H_{p, \text{participant}}}{H_{p, \text{reference}}}$$

•Geometric mean:

$$GM_{\bar{y}} = \sqrt[n]{y_1 y_2 y_3 \cdots y_n}$$

Trumpet curve condition



$$\frac{1}{F} \left(1 - \frac{2H_0}{H_0 + H_c} \right) \leq R \leq F \left(1 + \frac{H_0}{2H_0 + H_c} \right)$$

Where:

- $F = 1.5$
- $H_0 = 0.085 \text{ mSv}$

Note:

According to ISO 14146 H_0 is the “lower limit of the dose range for which the system has been approved”.

Results

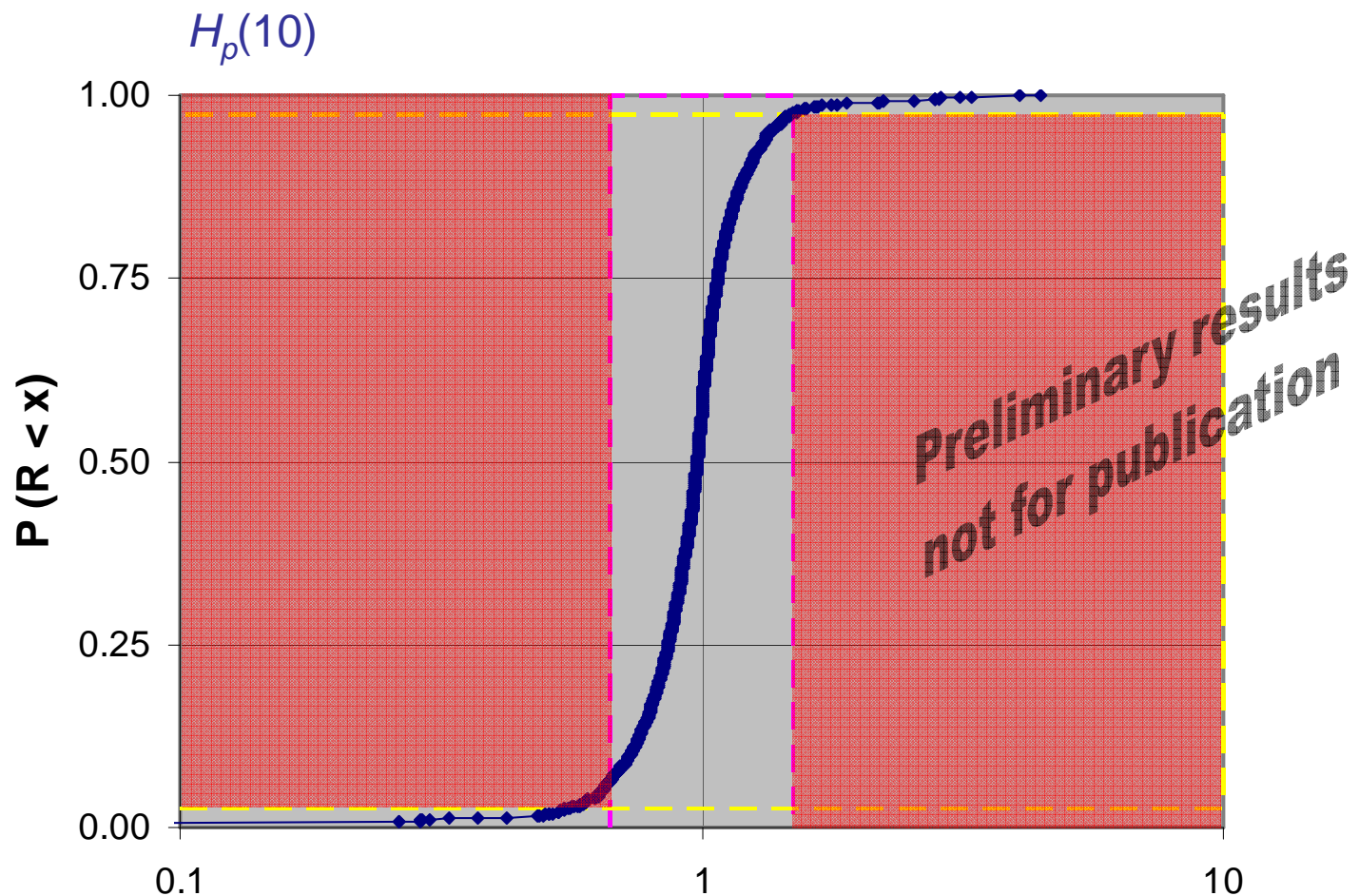


- All results for irradiated dosimeters (1240):

	$H_p(10)$	$H_p(0.07)$
Number of reported values	1229	951
	R	R
Arithmetic mean	0.99	1.04
Geometric mean	0.94	0.99
Median	0.98	0.98
Stdev	0.30	0.52
2.5th-percentile	0.55	0.59
97.5th percentile	1.48	1.79

Preliminary results
not for publication

All results

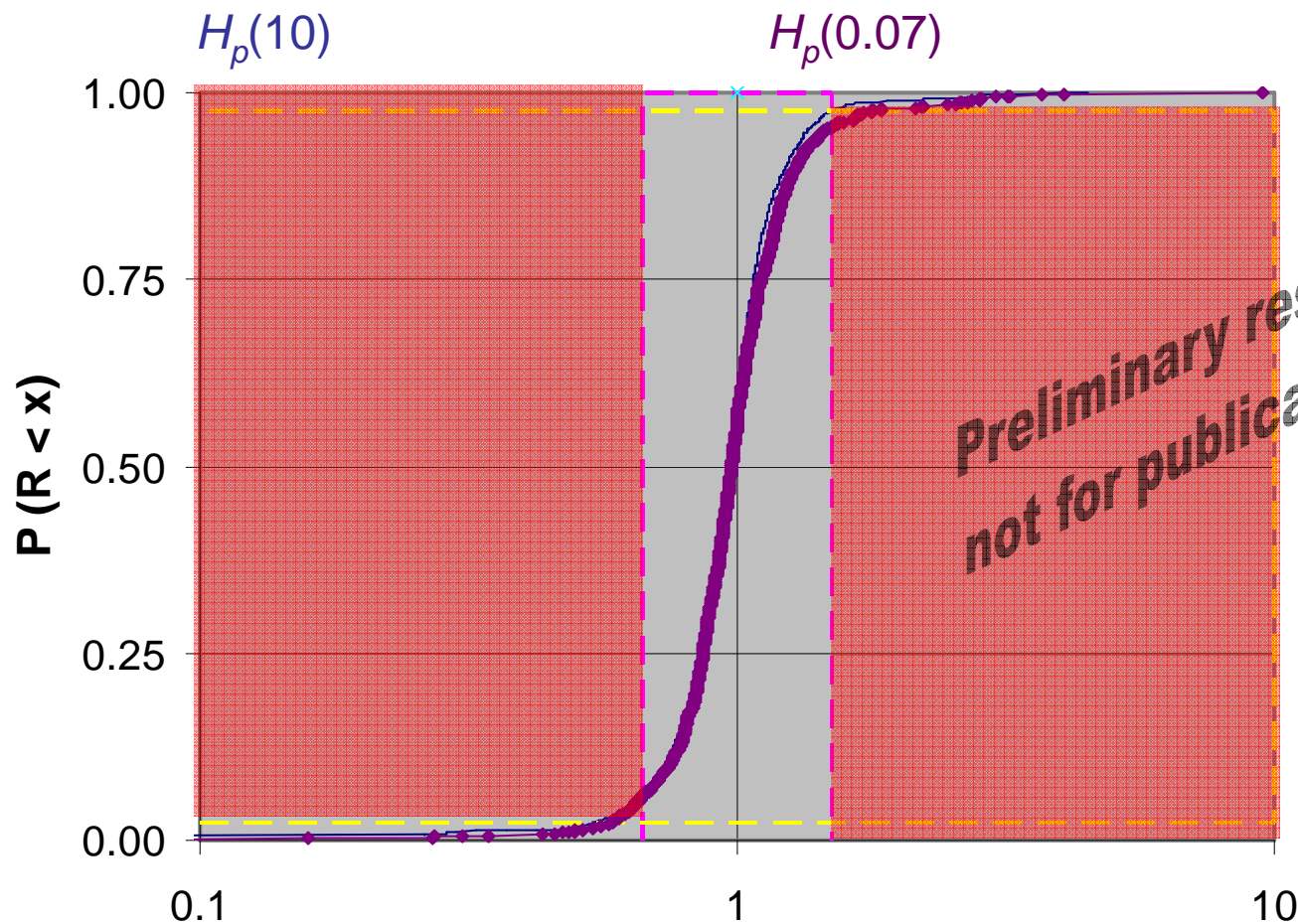


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All results

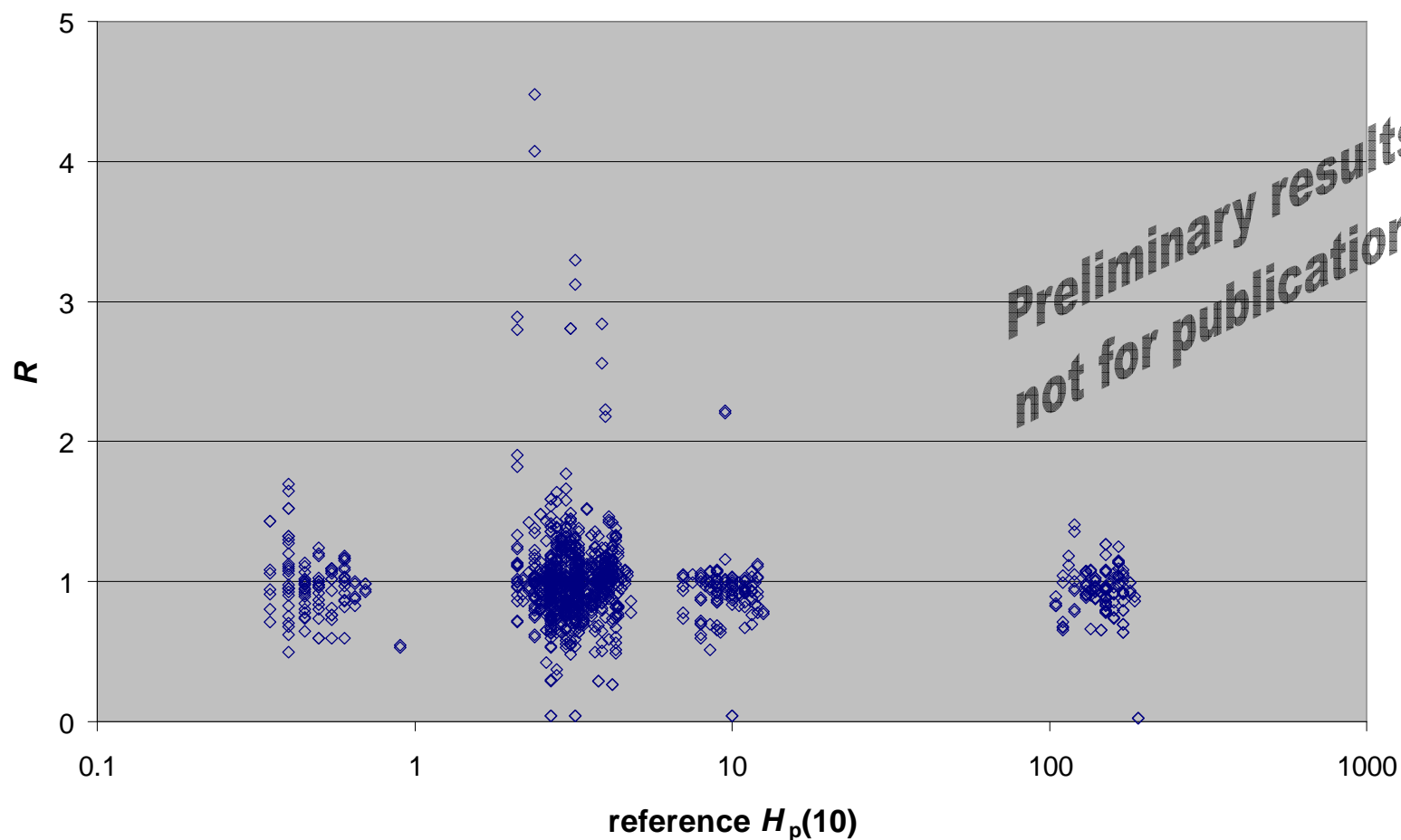


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Response versus dose

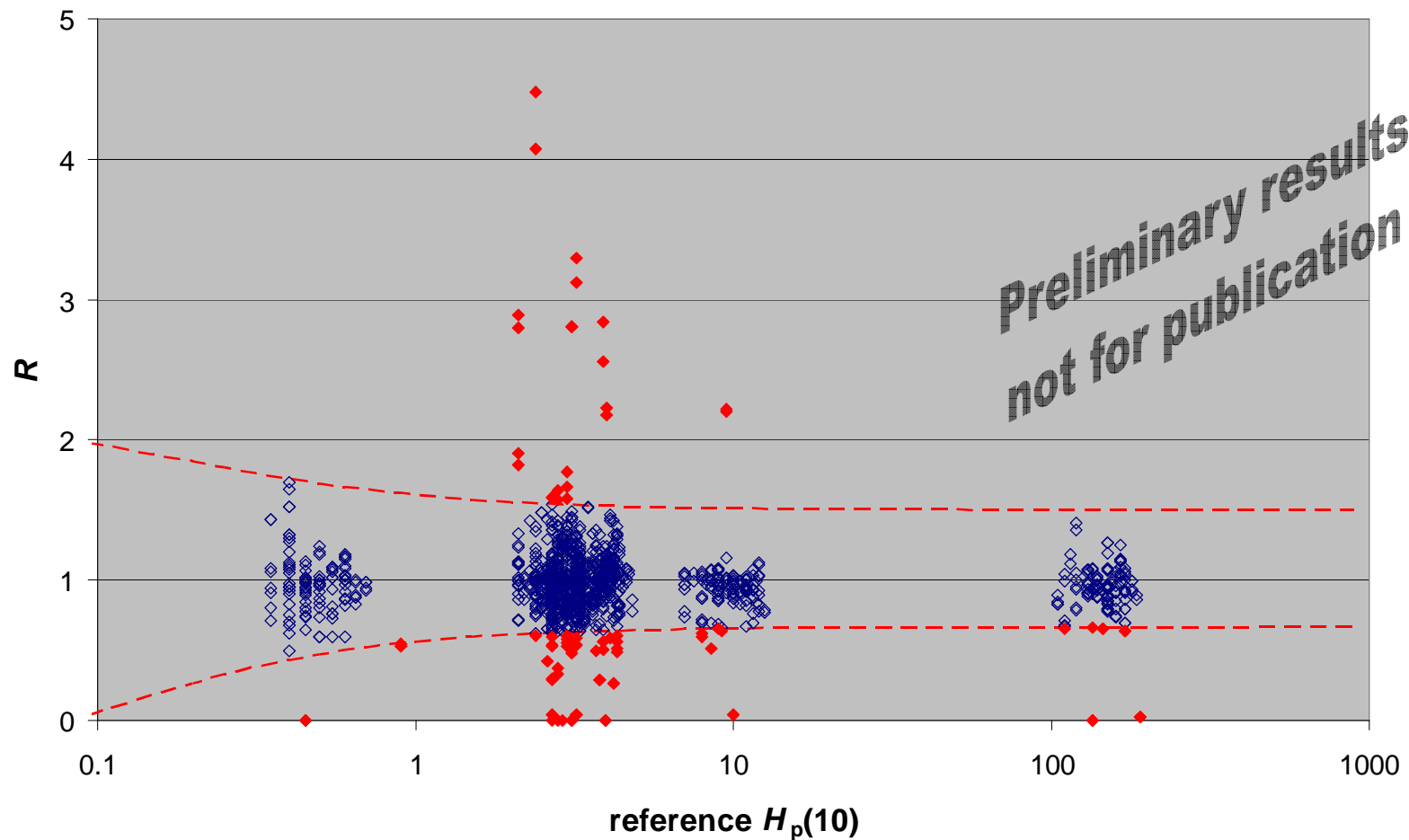


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Trumpet curve: 86 outliers (7%)

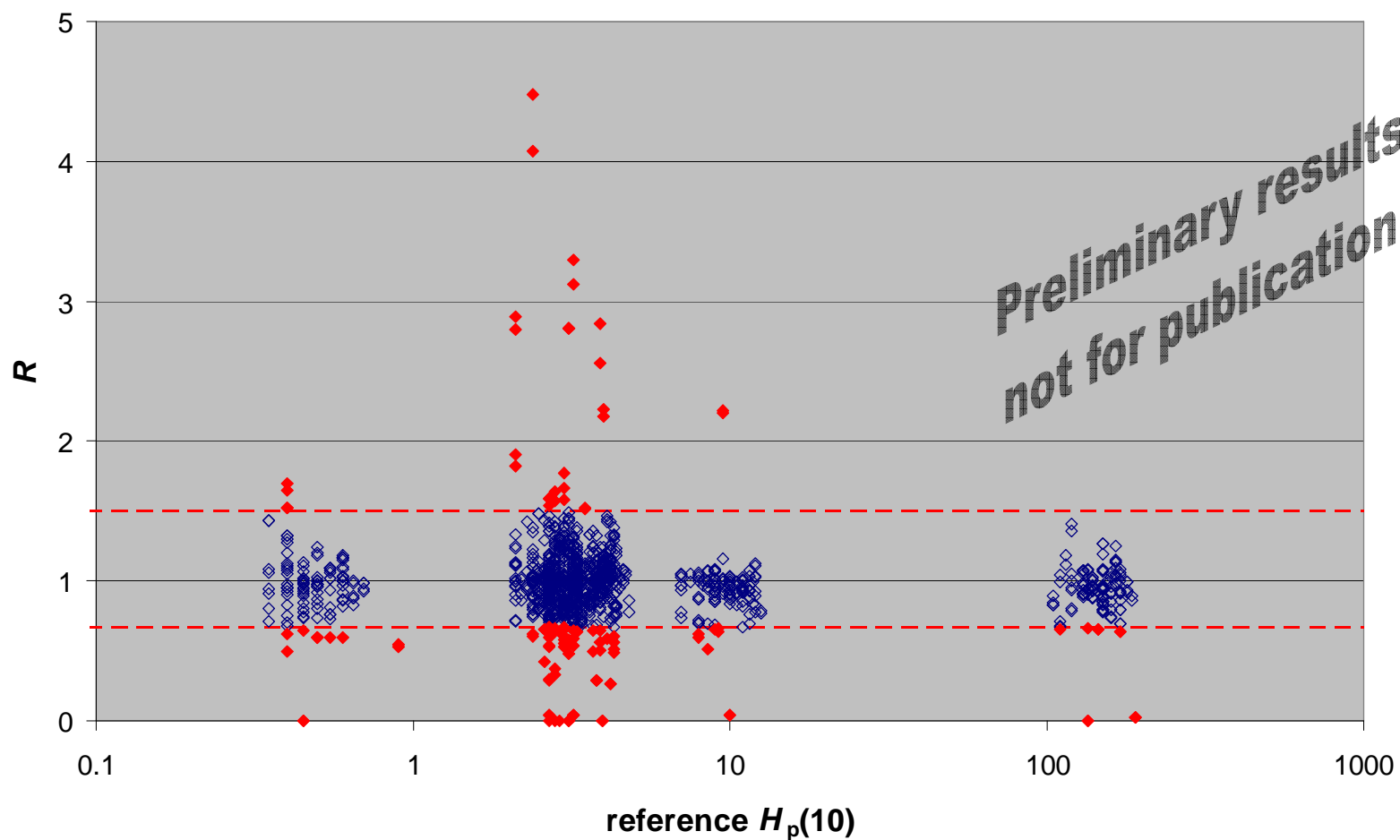


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Factor 1.5: 121 outliers (10%)

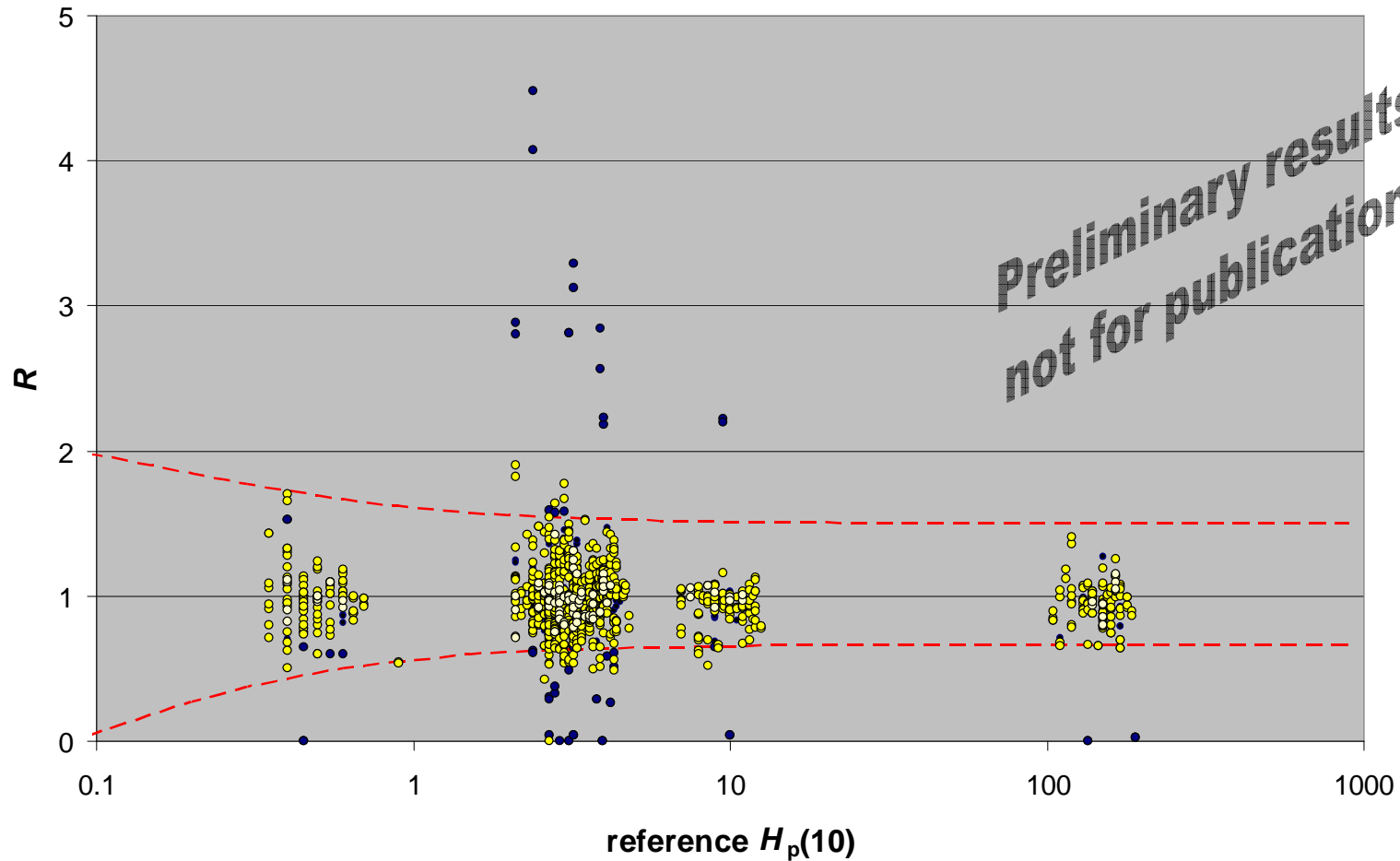


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Trumpet curve: Film: 50 outliers out of 200 (25%)
TLD: 35 outliers out of 920 (4%)
Other: 1 outlier out of 120 (1%)



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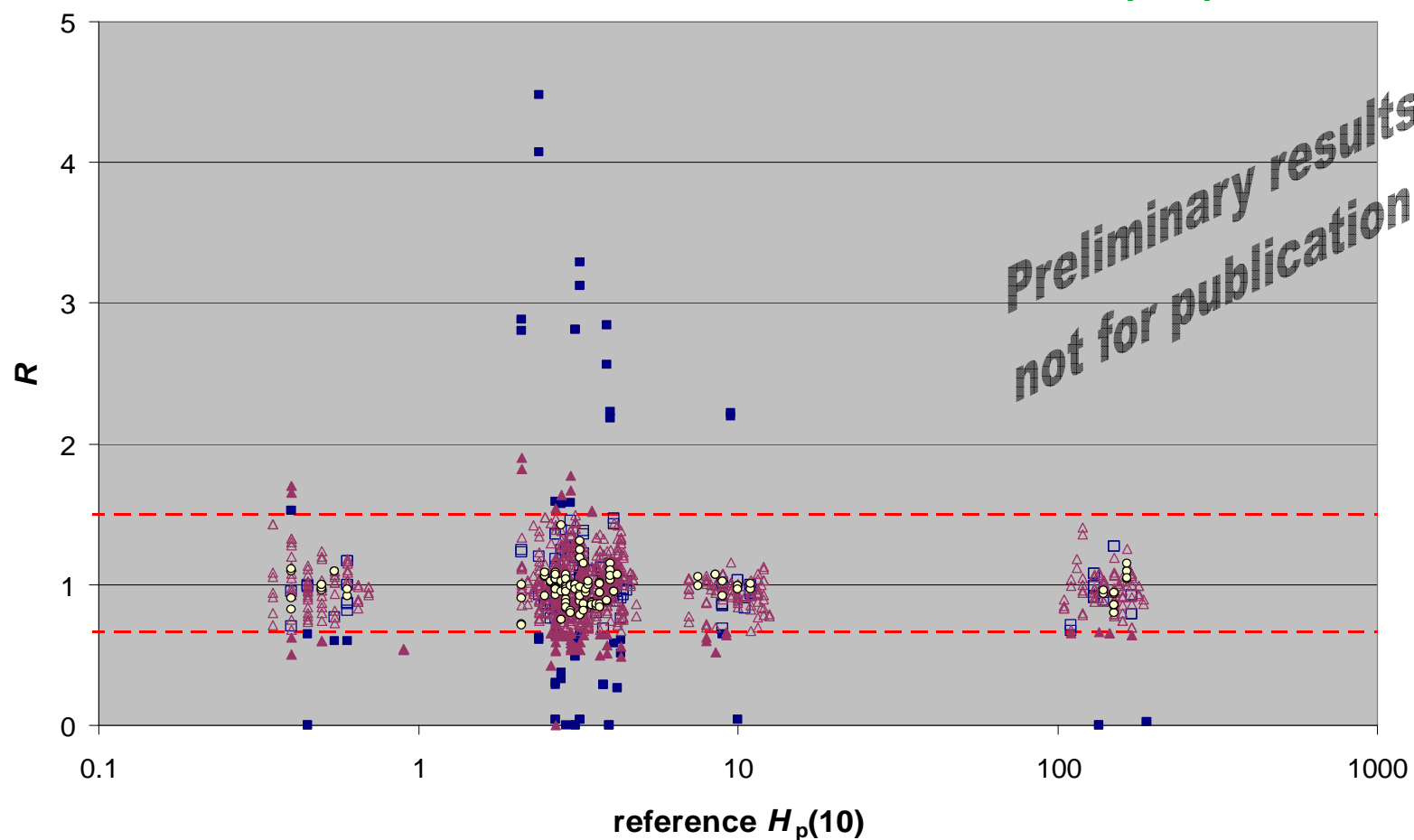
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Factor 1.5:

Film: 59 outliers out of 200 (30%)

TLD: 61 outliers out of 920 (7%)

Other: 1 outliers out of 120 (1%)

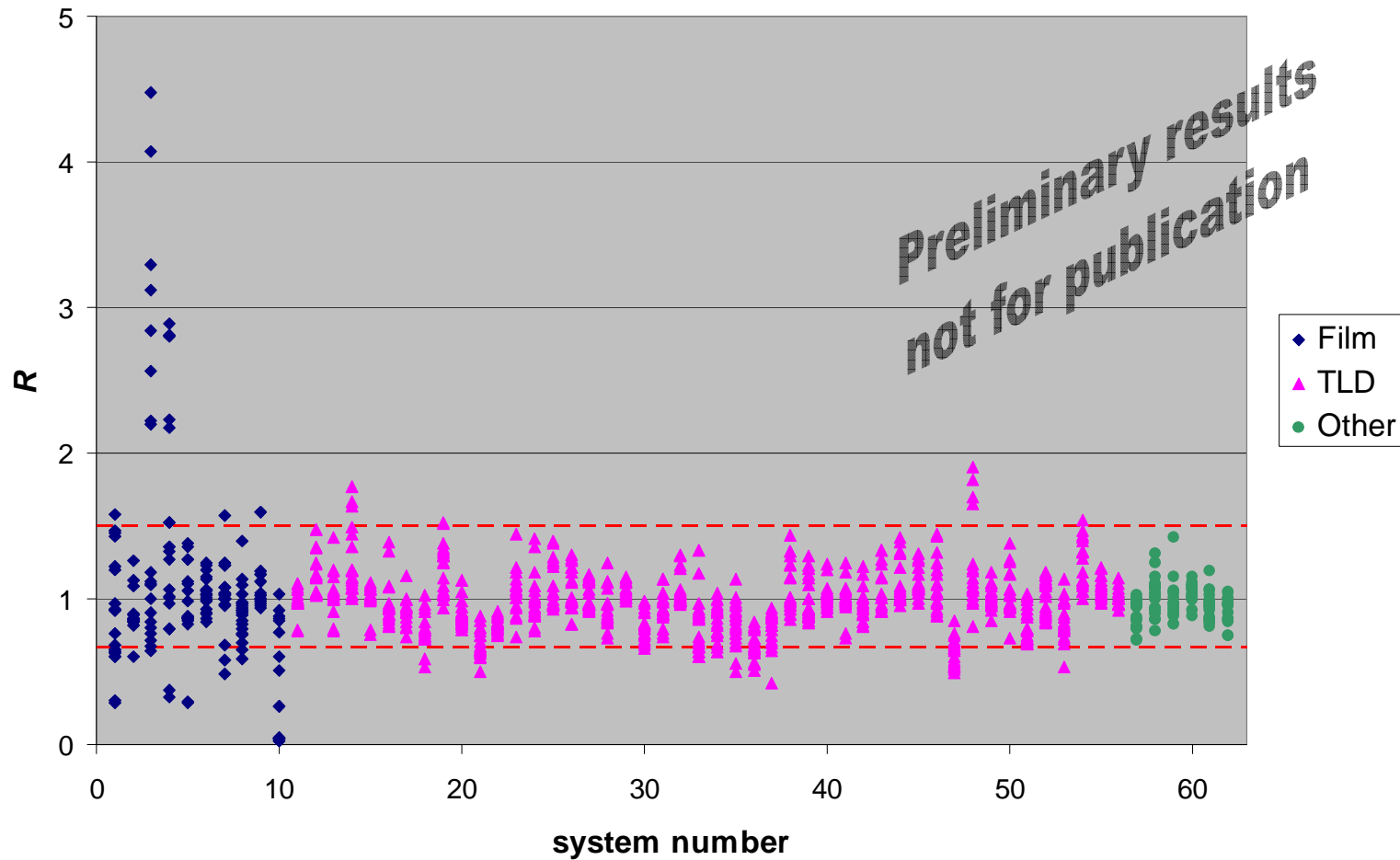


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Response per dosimetry system



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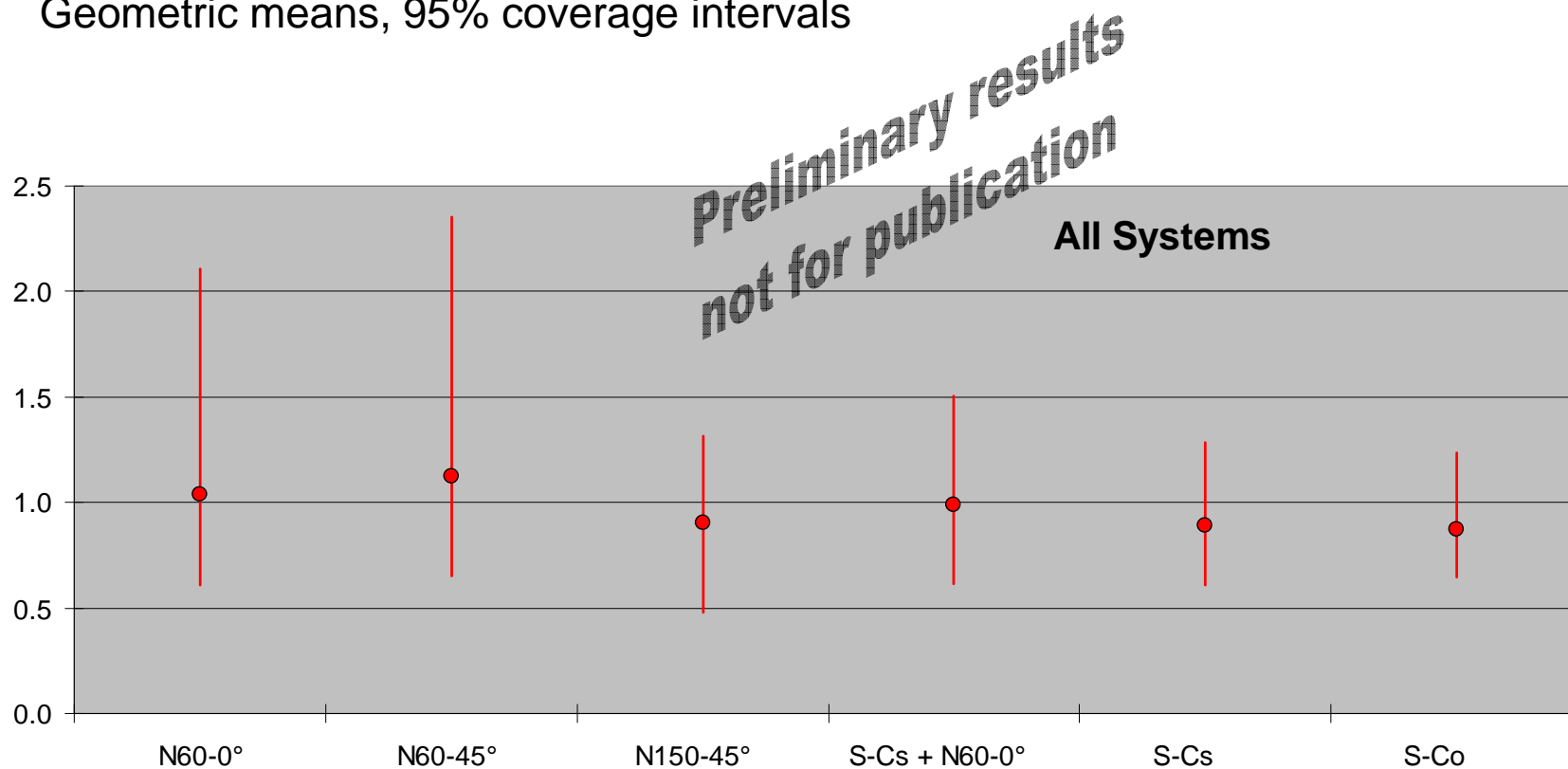


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Response per beam quality



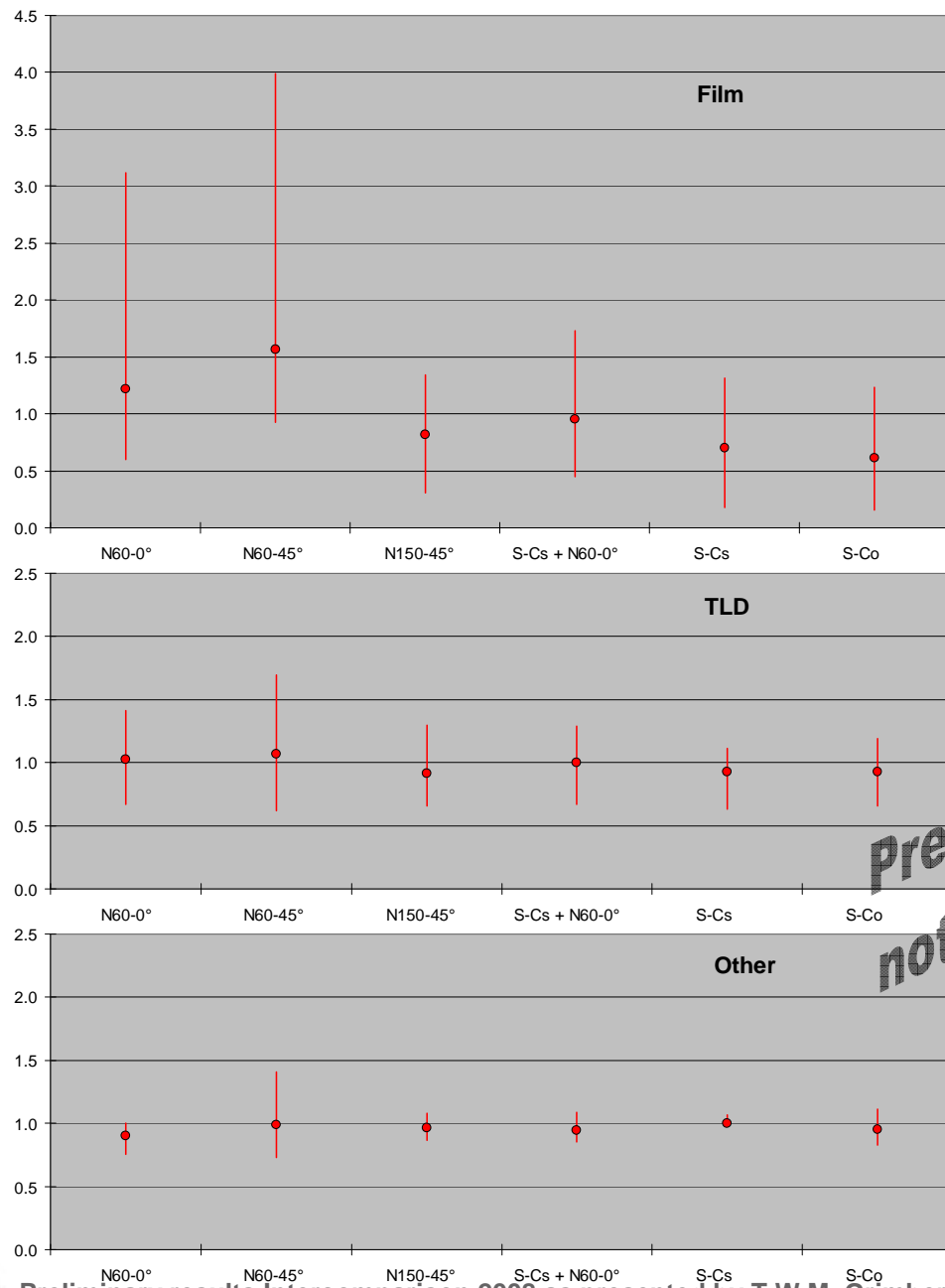
Geometric means, 95% coverage intervals



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Geometric means,
95% coverage intervals

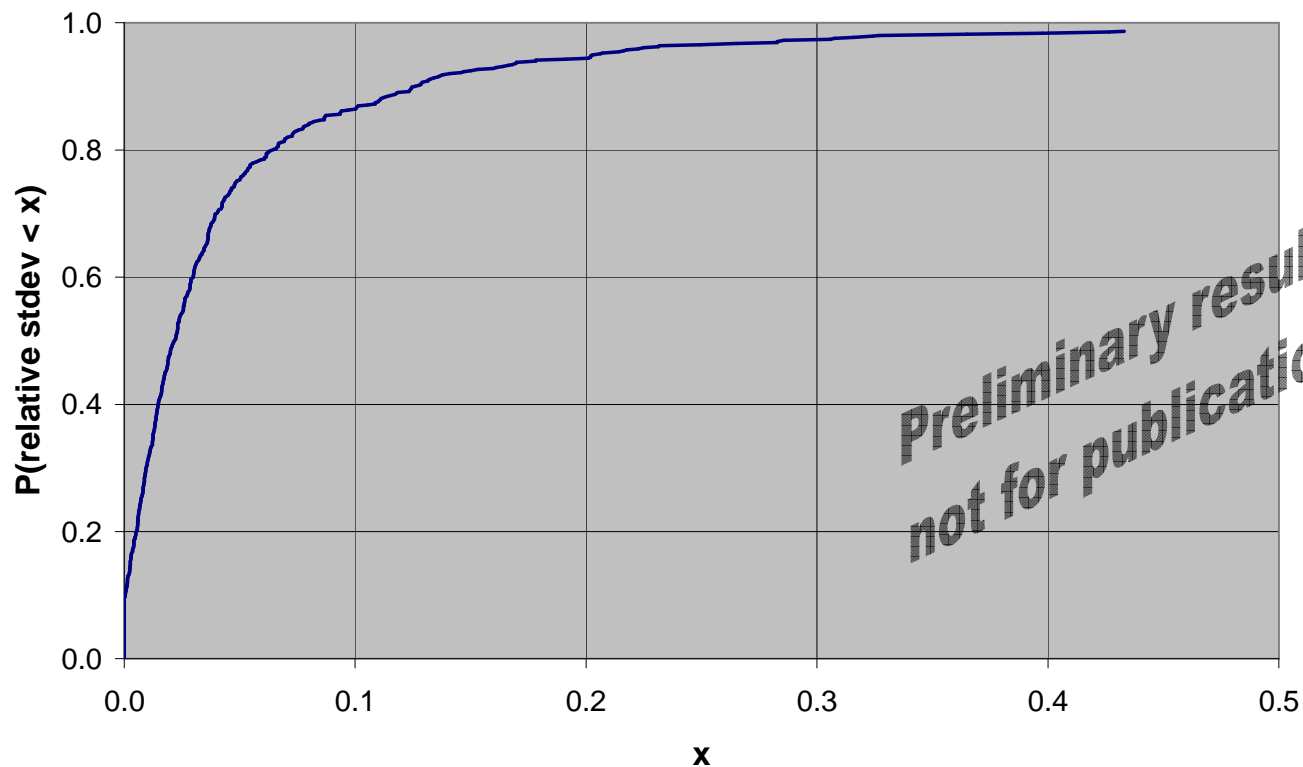
*Preliminary results
not for publication*

Reproducibility



Definition for a paired irradiation (same reference dose):

standard deviation of the two measured values, divided by the mean value of the these values



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Reproducibility: outliers



Red:
Relative stdev for a given
quality and system

is more than 10 times

the median value for that
system

N60-0°	N60-45°	N150-45°	N60-0° + S-Cs	S-Cs + N60-0°	S-Cs	S-Cs	S-Cs	S-Co
2	2	2	2	2	1	2	3	4
0.5	2.3	1.0	1.2	0.8	6.4	0.8	1.3	0.2
0.0	0.0	1.6	0.0	0.4	13.7	0.0	0.4	0.0
0.9	1.6	0.9	1.7	3.0	7.3	0.5	0.2	1.0
0.0	1.4	5.6	1.0	4.4	0.0	1.0	0.4	0.0
1.0	5.8	1.7	0.1	0.7	1.0	3.3	0.0	0.2
21.0	1.1	2.3	1.0	2.2	0.6	0.3	0.6	0.7
4.9	6.2	0.0	10.1	1.8	0.0	1.0	0.0	0.0
2.6	1.8	0.5	2.3	1.0	1.6	0.7	0.5	0.3
0.0	0.0	1.8	0.0	0.0	0.0	1.0	1.0	0.0
3.1	1.1	4.9	4.2	0.0	0.0	0.9	0.0	0.6
1.9	0.3	1.0	1.9	3.5	0.0	0.6	0.5	1.3
0.7	0.0	3.1	0.6	2.1	1.9	1.0	2.1	0.2
0.2	10.8	1.0	8.7	0.3	1.2	1.0	0.3	0.7
0.5	1.0	7.5	2.0	0.1	1.8	0.3	0.7	1.7
2.0	0.5	0.7	1.8	0.0	1.0	1.1	1.1	0.2
2.3	0.9	0.8	1.7	0.3	5.2	1.0	2.3	0.7
2.7	3.6	2.3	1.0	4.3	0.5	0.8	0.2	0.1
2.8	4.3	0.1	1.0	0.4	5.0	0.4	2.4	0.0
0.8	1.6	0.3	1.0	0.2	0.8	1.1	3.0	3.0
0.8	0.3	0.5	3.6	4.3	1.9	0.9	1.0	1.5
0.0	1.0	1.5	1.0	1.1	11.0	0.8	1.1	0.1
1.0	0.3	0.3	2.7	1.6	1.0	0.5	1.2	1.1
0.5	1.1	1.0	0.2	1.8	3.0	1.3	0.9	0.1
3.9	1.6	0.2	1.5	2.3	0.8	1.0	0.3	1.0
1.3	0.5	0.0	1.2	1.0	1.5	1.3	0.2	0.6
1.6	2.1	1.5	0.9	0.0	1.0	1.2	0.2	0.1
0.6	0.9	0.5	1.3	1.3	1.4	0.8	1.5	1.0
0.2	10.3	0.3	1.7	1.8	2.0	1.0	0.2	0.7
1.0	1.8	0.9	0.5	1.5	2.3	1.3	0.3	1.0
0.3	4.4	0.3	0.2	0.4	3.0	1.0	2.4	1.1
0.0	0.0	5.4	3.9	5.8	0.0	8.4	0.0	0.0
1.0	0.7	0.7	1.7	1.0	0.0	2.1	0.1	3.4
1.5	0.2	1.1	1.0	0.1	0.0	0.5	1.1	1.1
1.1	0.4	2.2	1.0	1.6	0.6	0.4	2.6	0.7
0.2	1.7	1.3	0.7	2.4	1.2	0.6	1.0	0.8
0.5	1.0	0.5	4.6	2.5	1.8	1.2	0.8	0.5
2.8	14.9	0.4	5.8	0.1	0.0	1.0	1.0	0.8
0.3	4.2	1.3	0.3	0.8	0.0	1.0	1.6	1.5
1.4	1.7	1.0	1.1	0.3	0.0	0.4	2.1	0.6
1.0	0.6	0.5	0.1	1.7	1.7	1.4	0.4	1.3
0.9	0.7	1.0	1.2	1.2	2.9	0.5	0.7	1.1
1.0	1.5	5.0	0.1	0.7	0.6	2.5	1.0	1.3
1.0	0.1	0.0	0.2	1.1	1.3	1.1	2.0	0.0
0.3	1.3	1.0	6.2	0.7	4.8	0.7	1.4	0.2
8.2	1.2	1.4	1.7	1.0	0.0	0.8	0.5	0.8
0.7	1.8	1.2	1.2	1.0	0.0	2.1	0.8	0.0
0.1	1.5	0.3	1.0	1.2	0.2	1.8	2.4	0.0
0.1	1.4	5.6	4.6	0.0	0.9	1.9	0.2	1.0
0.7	2.5	0.7	0.4	2.0	0.5	2.4	1.0	2.6
0.4	26.5	1.0	0.3	1.9	5.0	1.9	0.7	0.4
2.1	1.3	1.0	1.1	0.1	1.1	1.0	0.7	0.0
0.8	2.9	2.2	1.1	0.2	1.0	0.2	1.9	0.8
1.3	1.0	1.0	1.8	0.6	1.0	1.8	0.1	0.3
0.5	1.0	0.7	1.5	3.3	1.8	0.9	0.2	1.0
2.4	1.8	0.5	0.1	0.7	2.3	1.7	1.0	0.1
0.0	2.7	1.7	2.0	1.0	0.0	1.8	0.0	0.5
1.3	0.7	2.0	0.9	0.3	1.5	0.6	1.0	5.2
0.0	1.1	4.1	1.0	0.0	0.0	3.2	2.3	0.0
3.5	0.0	8.0	0.7	0.1	2.1	1.0	1.0	0.7
0.3	1.0	3.6	0.5	2.9	1.0	2.8	0.2	4.3
1.4	0.2	3.1	0.3	1.0	0.9	1.3	1.0	0.1
0.0	0.0	19.1	6.1	0.0	0.0	3.1	3.5	1.0

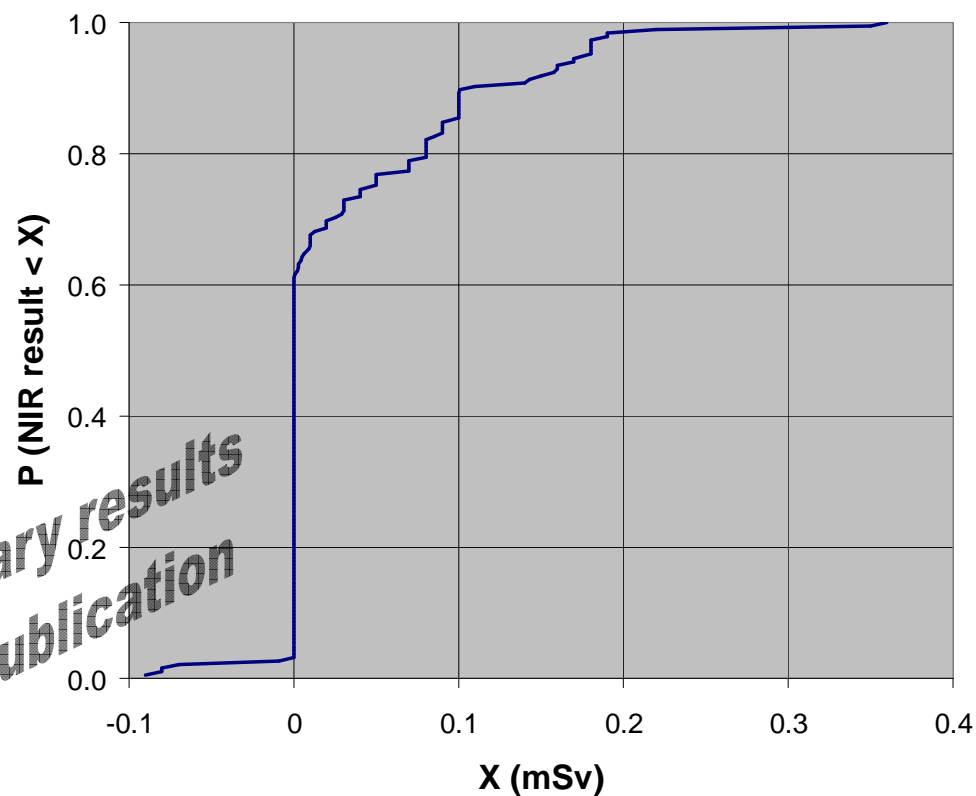
*Preliminary results
not for publication*

Background and transit dose



Background plus transit doses for the 3 packages from NRG to GAEC vice versa, measured with EPD

	Measured dose (uSv)
1	77
2	36
3	36

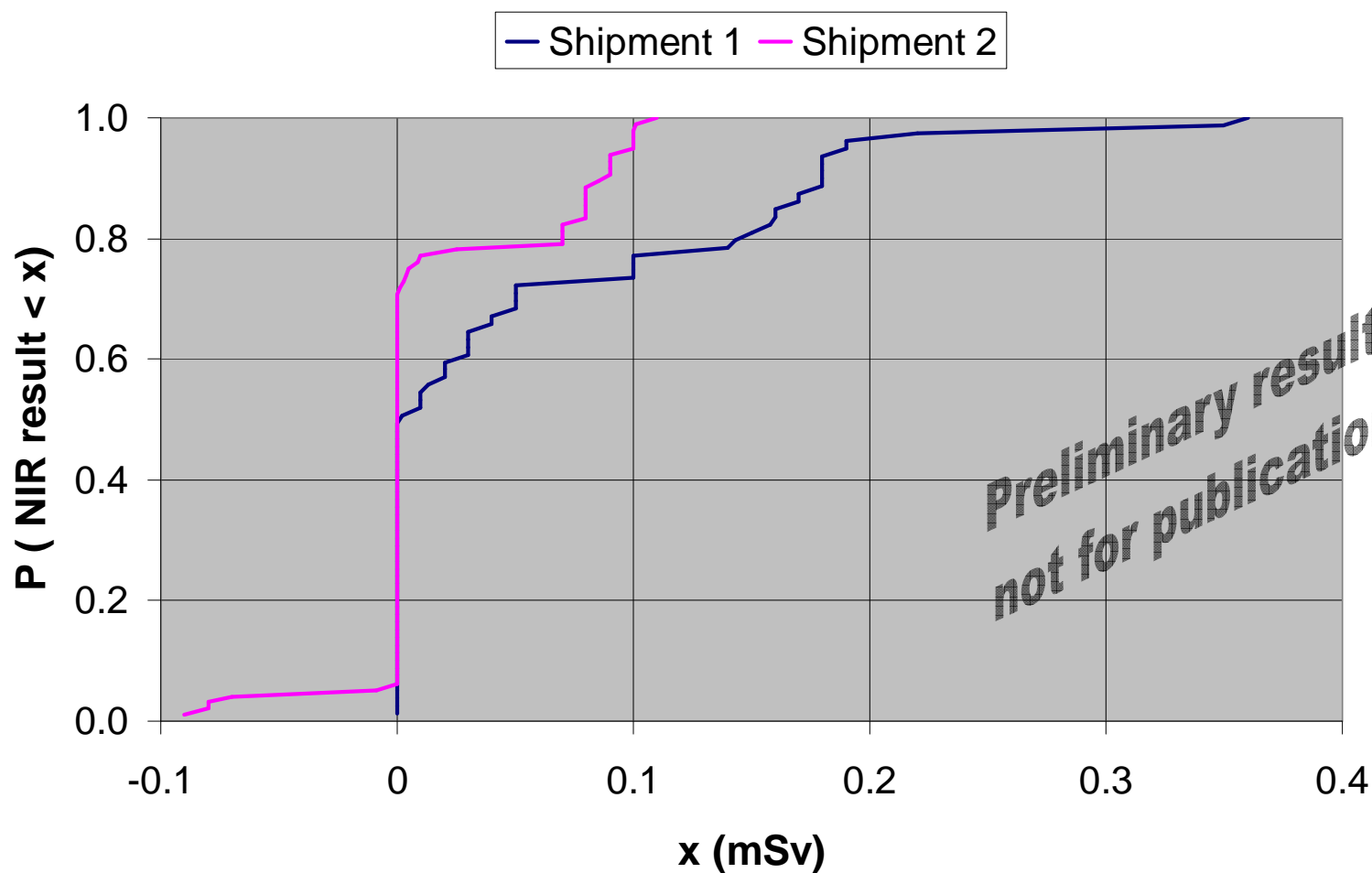


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Numerical Non Irradiated (NIR) dosimeter results per shipment



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Zero values being reported as:



Reported value (mSv)	Count
0	43
0.0	8
0.00	45
0.000	12
<0.000	1

*Preliminary results
not for publication*

Conclusion (results)



- On the average good performance for the participating systems
- A few “bad performances” most outliers with film
- A few unexplained results (60 kV 45°)
- Procedure to follow for background correction needs attention
- Suspected transit dose might have influenced low dose results

Conclusions (organization)



- No dosimeters lost, although some damaged
- Confidentiality maintained
- Archiving of the results needs attention
- Exchange of data and communication needs attention (2000 e-mails!)
- Certificates to be issued today
- Formal report will be prepared
- Questionnaire will follow