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Comments on "a bibliometric study of the trend in articles related to eutrophication published in Science Citation Index"

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In bibliometric research, the use of filter has a significant impact on data. Careless use of filter may lead to inaccurate results and wrong conclusions. The paper titled "a bibliometric study of the trend in articles related to eutrophication published in Science Citation Index" by Yi and Jie (2011) may have committed such error, and is an example of an inadequate, careless construed filter may mislead readers.

In the section of Materials and methods, the authors used only "Eutrophication" as the keyword to search parts of titles, abstracts, or keywords, and have stated "the total number of papers related to eutrophication research in the ISI web database between 1991 and 2010 is 9,782". In this instance, the authors did not consider other keywords that are synonymous to "eutrophication", for example "eutrophic". We conducted a search using "eutrophication" and "eutrophic" as keywords, and identified 15,088 papers were found in Science Citation Index Expanded (SCI-Expanded) between 1991 and 2010, a drastic increase of 54%. The analyses and results present in Yi and Jie (2011) were based on a grossly underestimated database, and thus may have presented misleading results.

Another search criteria used by Yi and Jie (2011) is also questionable. It concerns the date of data collection. The authors' stated "Citation counts of all the papers obtained on December 15th, 2010 when the SCI search process for this study was conducted", while claiming the study frame to be from 1991 through 2010. Thus, a half-month of citation was missing. The actual data time frame appears to be inconsistent with the author's claim.

To show the impact of inappropriate search filter, identical tables were reproduced here, but with "eutrophication" and "eutrophic" as keywords. Compared to results from Yi and Jie (2011), in which only "eutrophication" was used, 16 out of 20 countries in Table 1 have different rankings. In Table 2, 18 out of 20 journals would have different ranking, with only the top two journals remained the same. It appears that ranking of top country or top journal is less likely to be affected when the sample size is under-estimated. For other

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Table 1 Top 20 countries of authors of documents (1991–2010)

Country	TP	IP	CP	TP%
USA	3,482	2,551	931	23.2
Germany	1,258	757	501	8.38
UK	1,237	697	540	8.24
The Netherlands	985	590	395	6.56
China	951	676	275	6.34
France	898	530	368	5.98
Canada	807	447	360	5.38
Sweden	806	465	341	5.37
Japan	611	454	157	4.07
Finland	579	377	202	3.86
Spain	578	324	254	3.85
Denmark	571	260	311	3.80
Italy	554	323	231	3.69
Australia	479	286	193	3.19
Poland	430	339	91	2.87
Brazil	418	302	116	2.79
Switzerland	351	172	179	2.34
Portugal	254	138	116	1.69
Norway	248	100	148	1.65
Russia	231	156	75	1.54

TP total publications; *IP* publications without international cooperation; *CP* internationally collaborative publications; *TP%* share in publications

Table 2 The 20 journals with the highest number of publications

Journal	IF	P	P%	Subject category	Journal rank
Hydrobiologia	1.964	1,303	8.64	Marine and Freshwater Biology	26/93
Marine Ecology-Progress Series	2.483	389	2.58	Ecology	48/130
				Marine and Freshwater Biology	13/93
				Oceanography	9/59
Freshwater Biology	3.082	345	2.29	Marine and Freshwater Biology	8/93
Water Science and Technology	1.056	330	2.19	Environmental Engineering	31/45
				Environmental Sciences	140/193
				Water Resources	39/76
Limnology and Oceanography	3.385	315	2.09	Limnology	1/18
				Oceanography	4/59
Estuarine Coastal and Shelf Science	1.887	301	1.99	Marine and Freshwater Biology	31/93
				Oceanography	19/59
Marine Pollution Bulletin	2.359	278	1.84	Environmental Sciences	51/193
				Marine and Freshwater Biology	16/93
Archiv fur Hydrobiologie	N/A	242	1.60		

Table 2 continued

Journal	IF	P	P%	Subject category	Journal rank
Ecological Modelling	1.769	241	1.60	Ecology	68/130
Journal of Plankton Research	1.749	195	1.29	Marine and Freshwater Biology	34/93
				Oceanography	22/59
Water Research	4.546	193	1.28	Environmental Engineering	4/45
				Environmental Sciences	11/193
				Water Resources	1/76
Canadian Journal of Fisheries and Aquatic Sciences	2.166	184	1.22	Fisheries	6/46
				Marine and Freshwater Biology	18/93
Journal of Environmental Quality	2.236	168	1.11	Environmental Sciences	56/193
Science of the Total Environment	3.190	167	1.11	Environmental Sciences	26/193
Journal of Paleolimnology	2.676	160	1.06	Environmental Sciences	44/193
				Multidisciplinary Geosciences	24/167
				Limnology	3/18
Aquatic Microbial Ecology	2.089	156	1.03	Ecology	56/130
				Marine and Freshwater Biology	19/93
				Microbiology	61/107
Aquatic Botany	2.087	146	0.968	Plant Sciences	54/188
				Marine and Freshwater Biology	20/93
Water Air and Soil Pollution	1.765	132	0.875	Environmental Sciences	83/193
				Meteorology and Atmospheric Sciences	31/68
				Water Resources	19/76
Environmental Science and Technology	4.827	128	0.848	Environmental Engineering	2/45
				Environmental Sciences	9/193
Journal of Marine Systems	2.005	122	0.809	Multidisciplinary Geosciences	49/167
				Marine and Freshwater Biology	24/93
				Oceanography	16/59

IF impact factor in 2010; *P* number of publications; *N/A* was not listed in JCR in 2010

countries and journals, the ranking may fluctuate as many as 4 places. Japan improved its ranking from 13 to 9 in our analyses. Compare to results from Yi and Jie (2011), the actual distributions of impact factors, present in Table 3 here, showed that lower impact factor and high impact factor papers tended to be under-represented, while papers with mid-level impact factor were more likely to be over-represented. Other tables and figures are presented here, and they differ significantly from those presented in Yi and Jie (2011), in both actual numbers and trends (Fig. 1).

Table 3 Shares of publications in different ranges of impact factor in 2010

Impact factor	J	P	P%
$0 < IF \leqq 1$	439	2,285	15.1
$1 < IF \leqq 2$	359	5,433	36.0
$2 < IF \leqq 3$	205	3,330	22.1
$3 < IF \leqq 4$	101	1,861	12.3
$4 < IF \leqq 5$	41	700	4.64
$5 < IF \leqq 6$	30	203	1.35
$6 < IF \leqq 10$	37	153	1.01
>10	15	82	0.543
N/A	184	1,041	6.90

J number of journals, *P* total publications, *P%* share in publication

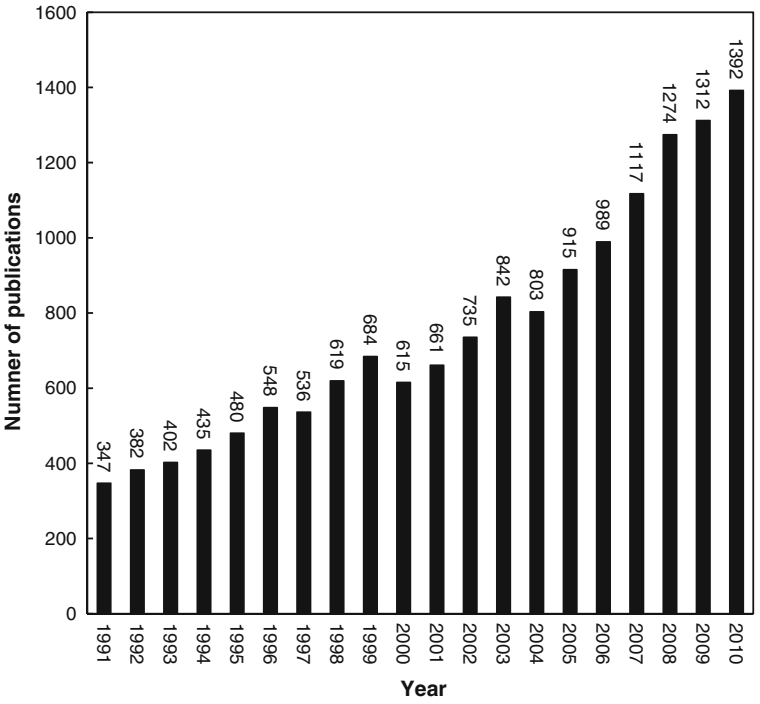

Fig. 1 World eutrophication research development

The use of search filter is crucial in bibliometric research. It is important to include synonyms while capturing relevant data for analyses. Some fields may favor on words over another. Exclusions of a synonymous keyword may under-estimate papers from a certain field of research, and thus, unable to represent the overall trend. In the case of Yi and Jie (2011), it clearly demonstrates the extensive impact on results when using inappropriate search filter (Tables 4, 5).

Table 4 The five journals with the highest impact factor

Journal	IF	P	P%	Subject category	Journal rank
Nature	36.101	16	0.106	Multidisciplinary Sciences	1/59
Science	31.364	20	0.133	Multidisciplinary Sciences	2/59
Nature Reviews Microbiology	20.686	1	0.00663	Microbiology	1/107
Ecology Letters	15.253	15	0.0994	Ecology	1/130
Annual Review of Marine Science	15	3	0.0199	Geochemistry and Geophysics	1/77
				Oceanography	1/59

IF impact factor in 2010; *P* number of publications

Table 5 Author keywords in five periods

Author keywords	Rank (percentage of papers containing this keyword, %)					
	2007–2010	2003–2006	1999–2002	1995–1998	1991–1994	1991–2010
Eutrophication	1 (26.0)	1 (27.3)	1 (28.7)	1 (31.1)	1 (36.2)	1 (28.1)
Phosphorus	2 (7.5)	2 (9.77)	2 (9.63)	2 (9.70)	2 (10.3)	2 (8.92)
Nutrients	3 (5.96)	3 (7.05)	5 (5.84)	4 (6.39)	4 (4.87)	3 (6.20)
Water quality	4 (5.46)	6 (4.85)	6 (3.79)	6 (5.24)	7 (4.49)	4 (6.19)
Phytoplankton	5 (5.44)	4 (5.86)	4 (5.94)	3 (8.48)	3 (8.21)	5 (5.63)
Nitrogen	6 (5.35)	5 (5.58)	3 (6.48)	5 (5.82)	4 (4.87)	6 (4.92)
Cyanobacteria	7 (3.15)	7 (3.28)	10 (2.19)	10 (2.44)	13 (2.31)	7 (2.87)
Diatoms	8 (2.67)	9 (2.65)	7 (3.54)	8 (2.80)	10 (2.69)	8 (2.84)
Zooplankton	9 (2.58)	10 (2.37)	8 (2.84)	7 (3.09)	4 (4.87)	9 (2.80)
Sediment	10 (2.46)	8 (2.90)	12 (2.00)	9 (2.51)	15 (2.18)	10 (2.48)
Macrophytes	11 (1.94)	12 (1.71)	11 (2.04)	14 (2.08)	25 (1.67)	11 (1.90)
Climate change	12 (1.92)	43 (0.803)	52 (0.848)	108 (0.503)	491 (0.128)	12 (1.85)
Baltic sea	13 (1.77)	11 (2.06)	9 (2.24)	24 (1.51)	39 (1.15)	13 (1.66)
Water framework directive	14 (1.75)	48 (0.768)	436 (0.150)	N/A	N/A	14 (1.50)
Hypoxia	15 (1.66)	13 (1.68)	22 (1.45)	40 (1.08)	106 (0.513)	14 (1.50)
Life cycle assessment	16 (1.47)	43 (0.803)	107 (0.499)	N/A	N/A	16 (1.47)
Estuary	16 (1.47)	21 (1.33)	17 (1.60)	34 (1.15)	33 (1.28)	17 (1.40)
Sediments	18 (1.28)	22 (1.26)	21 (1.50)	17 (1.94)	8 (2.82)	18 (1.36)
Lakes	18 (1.28)	14 (1.64)	14 (1.85)	17 (1.94)	8 (2.82)	19 (1.29)
Shallow lakes	20 (1.21)	16 (1.54)	22 (1.45)	50 (0.934)	49 (1.03)	19 (1.29)
Nitrate	20 (1.21)	16 (1.54)	31 (1.15)	40 (1.08)	31 (1.54)	19 (1.29)

N/A this word was not found in any article as author keyword in the period

Reference

Yi, H., & Jie, W. (2011). A bibliometric study of the trend in articles related to eutrophication published in Science Citation Index. *Scientometrics, 89*(3), 919–927.