

# Soil Bibliometrics



## More on Self Citations

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Some two years ago we wrote about self citations (Pedomtron No. 22, pages 11-13). Self citation is indeed a favourable attribute and self-citations account for between 10% and 20% of all references, but it differs between disciplines. We analysed and manually counted papers from Pedometrics Special Issues which have been published in Geoderma. The minimum and maximum self citations that were found ranged between 0 and 60%, with a median of 15%. In general, Pedometrics papers have a self citation rate of around 15%. We had the impression that the self-citation rates differed considerable between countries. Here we we look at self citations by countries and also by journals. Self citation here can also mean that in your paper you cite papers from your own country or cite papers from the same journal.

### Country Self citations

We used the data from SCImago for the period 1996-2007 in soil science. The SCImago Journal & Country Rank ([www.scimagojr.com](http://www.scimagojr.com)) is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus database from Elsevier. These indicators can be used to assess and analyse scientific domains. Country self citation means the percentages of the citations received by the papers which come from the same country as from which the papers were published. Or you cite papers that come from your own countries. Figure 1 shows the number of papers produced and the percentage of self citations.

Countries with the highest no. of self citations are China and USA (63 and 48%, respectively). For the complete data see [www.scimagojr.com](http://www.scimagojr.com)

The trend seems to be that with every 10 fold increase in the number of papers, there is a 10% increase in self citations. So the more papers a country produce, the more likely it will refer to its own work. This is because the more papers a country produced, there will be more chance that a person from that country will cite more work from its own country. Countries with a large body of work are more inclined to cite papers from their own fellow countrymen and women. Smaller countries have fewer papers and hence cite more papers from other countries.

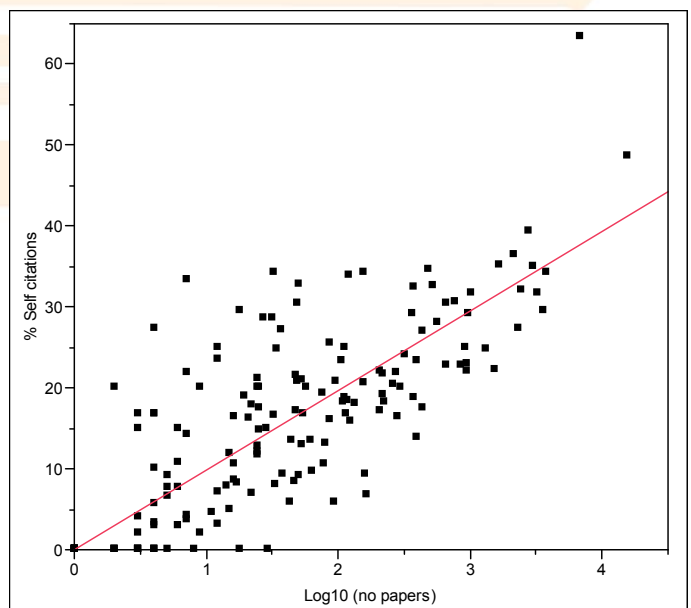


Figure 1. Log(number of papers) produced by various countries in the area of soil science 1996-2007 and its relationship with percent of self citations. % Self citations =  $9.8 * \text{Log}_{10}(\text{no papers})$ . (data from SCImago)

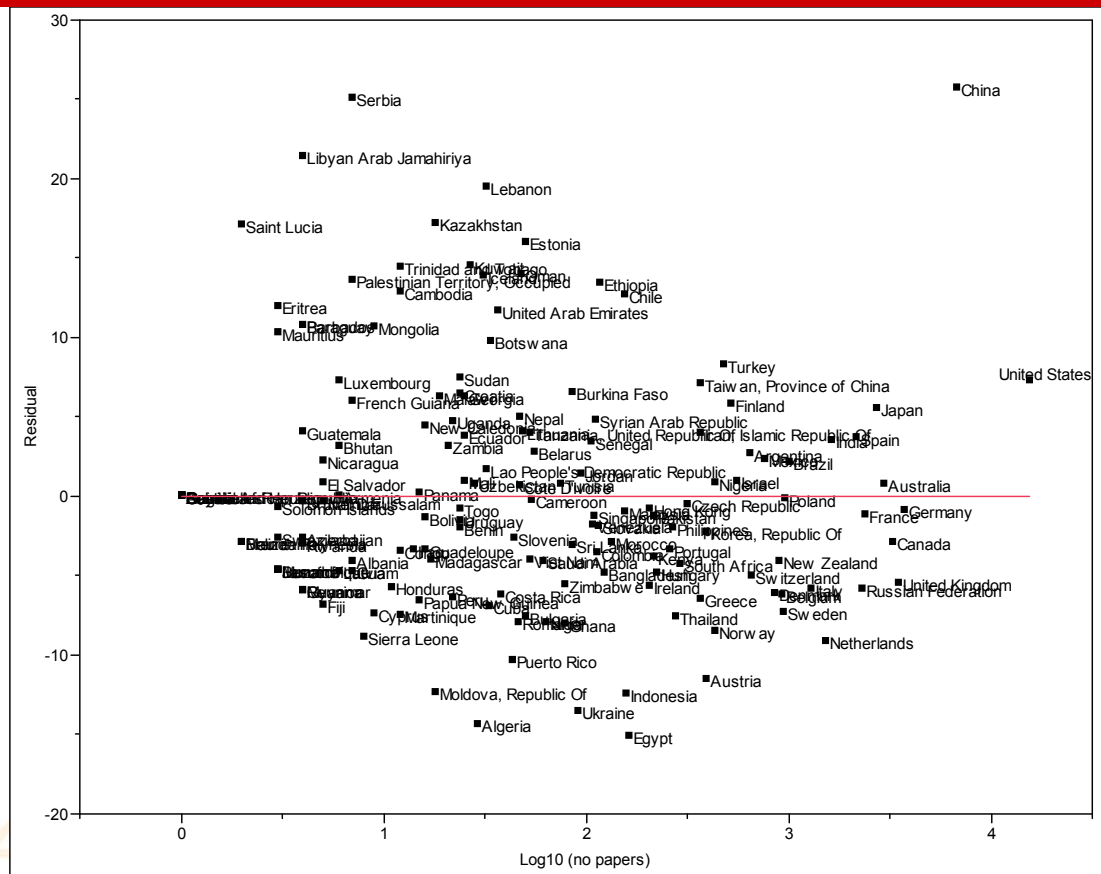


Figure 2. Residuals of the regression line from Figure 1.

If we take out the trend, we can see the residuals of the regression (Figure 2). We can see which countries depart most from the trend or zero residuals. Some countries with high self esteem tend to over-cite themselves, but there are also countries who under-cite themselves. The US that seems to have a high country self citation rate according to the trend line should have a self citation rate of 41%. This is because US produces a lot of scientific work and it is normal that they will cite more work that come out from US. Meanwhile China, Serbia, Libya have high residuals, meaning that they tend to over cite themselves. Egypt, Algeria, Ukraine, Indonesia and other tend to under-cite themselves.

The trend line also gives you the likely country self citation rate for a paper. For example, a paper from Australia would have about 34% of self citations, the Netherlands: 31%, UK and Germany: 35%.

## Journal Self citations

Journal self citations is an interesting subject as it can boost the impact factor! Impact factor is regarded as a measure of the quality of the journal and most scientists would like to publish in a high impact journal. But can the impact factor be manipulated with journal self citations? Journal self citation here means that you cite papers that are from the same journal.

Table 1 lists the impact factor of soil science journals from the 2008 Journal Citation Reports® from ISI. The distribution of self citations (Figure 3) is skewed by 3 outliers. The median percentage of self citations is 12%. So it seems that 12% is about a normal self citation rate for a journal. As a comparison, the self citation rate in Nature and Science is 1%.

The impact factor can be manipulated by boosting journal self citations, for example the *Journal of Soils and Sediments* is ranked no. 2 simply because 42% of the citations are from the journal itself.

There is another metric called the Eigenfactor™ score that counters this problem. The Eigenfactor™ score ranks the influence of journals in the same way as

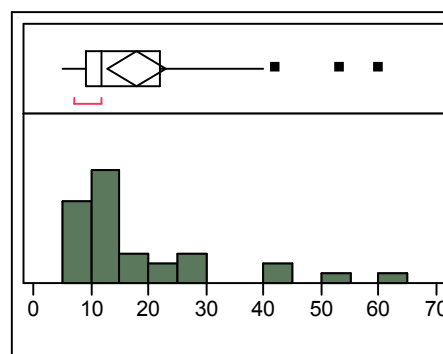


Figure 3. Distribution of percentage of self citations from soil science journals used in the impact factor calculation.

Table 1. Impact factor and Eigenfactor Score for the major Soil Science Journals in 2008 (from ISI)

Journal	Rank by Impact factor	Impact factor	Rank by Eigenfactor score	Eigenfactor score	% Self citations (used in Impact Factor Calculation)
Soil Biology and Biochemistry	1	2.926	1	0.03265	18
Journal of Soil and Sediment	2	2.797	25	0.00164	42
Applied Soil Ecology	3	2.247	8	0.00838	11
European Journal of Soil Science	4	2.24	6	0.01024	8
Soil Science Society of America Journal	5	2.207	3	0.02381	12
Geoderma	6	2.068	4	0.01978	15
Plant and Soil	7	1.998	2	0.02721	12
Soil Use and Management	8	1.895	17	0.00409	9
Catena	9	1.874	9	0.00773	10
Soil and Tillage Research	10	1.695	5	0.01136	10
Pedobiologia	11	1.451	16	0.0041	5
Biology and Fertility of Soils	12	1.446	10	0.00707	10
Vadose Zone Journal	13	1.441	7	0.0084	28
Journal of Plant Nutrition and Soil Science	14	1.284	12	0.00504	11
Nutrient Cycling in the Agroecosystems	15	1.282	11	0.00509	8
Land Degradation and Development	16	1.245	22	0.00239	16
Clays and Clay Minerals	17	1.171	15	0.00411	12
Soil Science and Plant Nutrition	18	1.152	20	0.00294	29
Journal of Soil and Water Conservation	19	1.121	19	0.0032	22
Soil Science	20	1.037	13	0.00456	7
Canadian Journal of Soil Science	21	1.023	21	0.00294	14
European Journal of Soil Biology	22	0.888	24	0.00189	12
Pedosphere	23	0.865	23	0.00203	8
Australian Journal of Soil Research	24	0.856	14	0.00438	20
Revista Brasileira de Ciencia do Solo	25	0.66	26	0.00119	60
Compost Science and Utilization	26	0.638	27	0.00115	25
Acta Agriculturae Scandinavica - Section B Soil and Plant Science	27	0.407	28	0.00067	8
Communications in Soil Science and Plant Analysis	28	0.357	18	0.00401	7
Arid Land Research and Management	29	0.348	29	0.00064	12
Agrochimica	30	0.179	31	0.00024	40
Eurasian Soil Science	31	0.149	30	0.00048	53

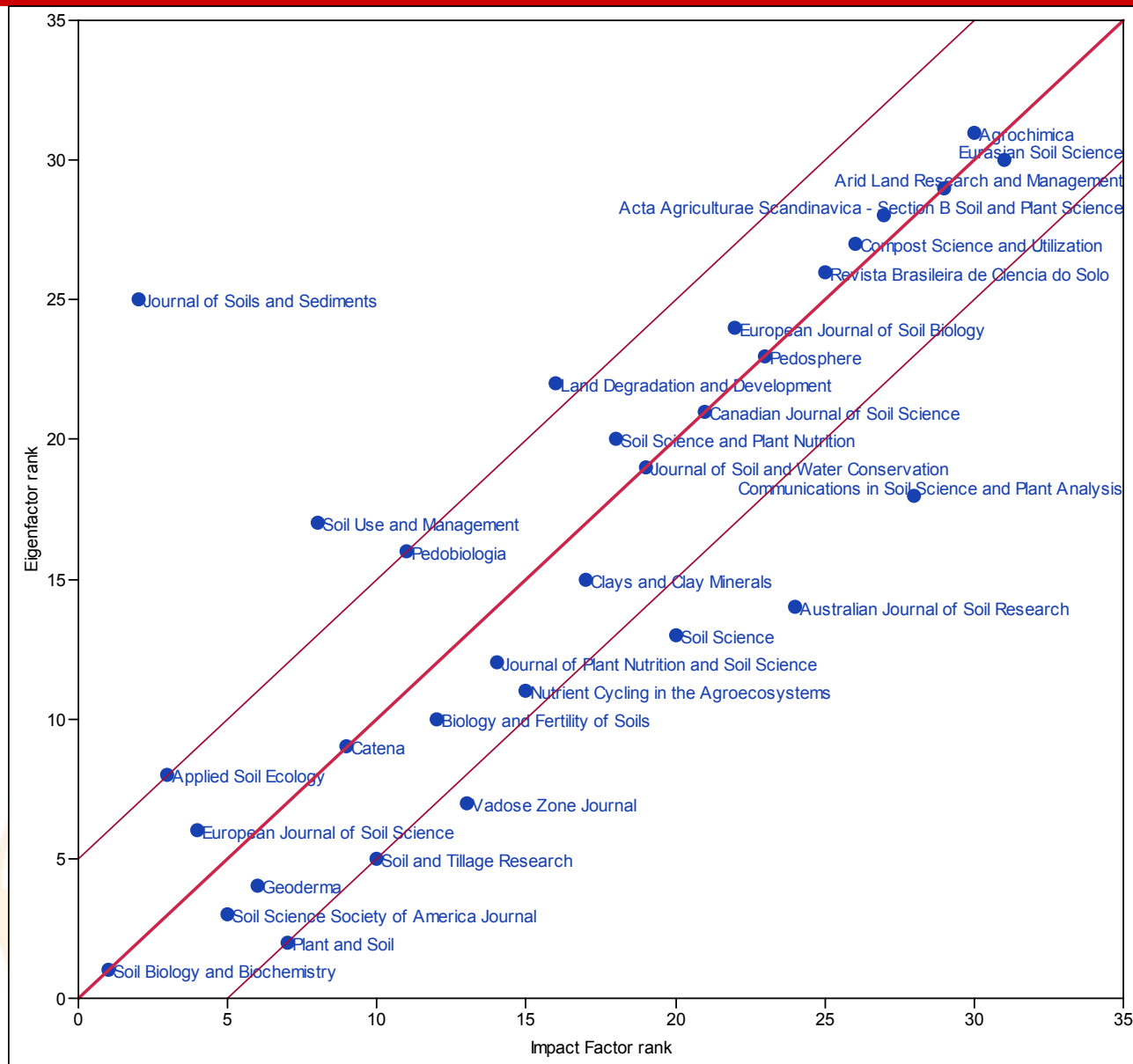


Figure 4. Soil Science journals' rank according to impact factor and Eigenfactor score. The thick line represents a 1:1 line, the outer lines represent a score different of 5 between the two rankings.

Google's PageRank algorithm ranks the influence of web pages. Journals are considered to be influential if they are cited often by other influential journals. See [www.eigenfactor.org](http://www.eigenfactor.org) for more details. So the Journal of Soil and Sediment is ranked 25 based on Eigenfactor™ score.

If we plot the rank according to impact factor and eigenfactor score (Figure 4), we can see that most journals are close to the 1:1 line, except for Journal of Soil and Sediment. Soil Biology and Biochemistry ranks the first under both scores. There are journals which have a lower impact factor rank, but a higher eigenfactor rank. For example, Soil Science and Australian Journal of Soil Research have low impact factor rank, but in fact they were being cited by more influential journals. Meanwhile Soil Use and Management has a higher impact factor, but may not be cited by more influen-

tial journals. And Journal of Soils and Sediments is way outside the 1:1 line, indicating an extremely high self citation rate that favoured its impact factor.

In conclusion, self citation is contagious. Not only that you can boost your h index, but your country's pride and also your preferred journal's impact factor. (Note: If every time you published a paper, you cite every single paper that you have previously published, your h index will be at least the integer of  $(n/2)$ , with  $n$  is the number of paper you have published).