

# A BIBLIOMETRIC APPROACH TO ILL DATA AT THE GODDARD SPACE FLIGHT CENTER

Brynne Norton  
brynne.s.norton@nasa.gov  
Information Services Team Lead  
NASA Goddard Space Flight Center  
Cadence Group



# GODDARD'S PROFILE

- 10,000 employees, only a portion do research
- Renovated in March 2016 leading to a great increase in traffic
- Collection is weighted towards eResources
- Full time Interlibrary Loan Coordinator who also works the Information Desk



HOW DO WE MEASURE THE  
IMPACT OF INTERLIBRARY LOAN?

## TRADITIONAL METRICS

# Fill Rate

1	Status	Articles	Loans	Total
2	Submitted	581	225	806
3	Cancelled	66	24	90
4	In Process	0	0	0
5	Filled	515	201	716

### Article Fill Rates



Filled: 89 % In Process: 0 % Cancelled: 11 %

### Loan Fill Rates



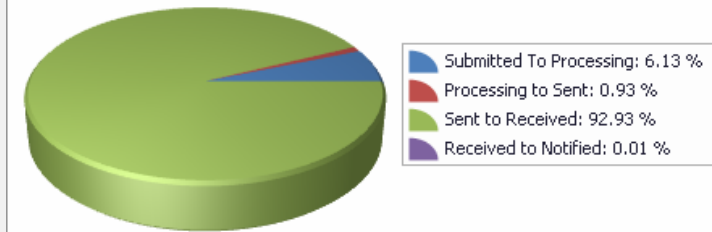
Filled: 89 % In Process: 0 % Cancelled: 11 %

## TRADITIONAL METRICS

# Turnaround Time

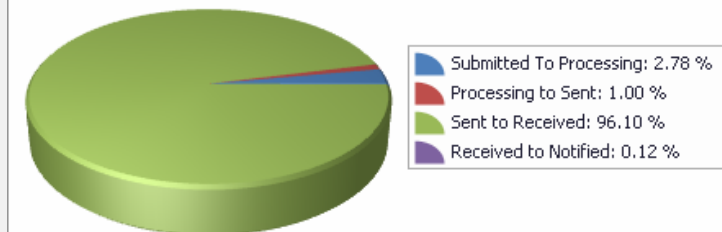
Total Number of Selected Article Records	56
Average Time from Submitted to Processing	10.37 hours
Average Time from Processing to Sent	1.58 hours
Average Time from Sent to Received	6.55 days
Average Time from Received to Notified	0.61 minutes
Average Total Time	7.05 days

Turnaround Time for Articles



Total Number of Selected Loan Records	69
Average Time from Submitted to Processing	7.38 hours
Average Time from Processing to Sent	2.65 hours
Average Time from Sent to Received	10.61 days
Average Time from Received to Notified	18.61 minutes
Average Total Time	11.04 days

Turnaround Time for Loans



## TRADITIONAL METRICS

# Most Requested Journals

1	OCLC Number	Journal Name	Number of Requests
2	1480820	ASLE transactions.	5
3	5266757	Aerospace daily.	4
4	1567758	Electronics	4
5	1756256	Lubrication engineering.	4
6	20425957	Soldering & surface mount technology : journal of the SMART (Surface Mount &	4
7	853306	Abstracts with programs - Geological Society	3
8	3493148	Annual meeting - Association of Engineering	3
9	1482042	Archive for history of exact sciences.	3
10	18956055	Educational technology research and development : ETR & D.	3
11	1570633	Geofysiske publikasjoner,	3
12	1570724	Geophysics.	3
13	1795941	Journal of archaeological science.	3
14	15722504	Journal of modern optics.	3
15	864374255	Journal of unmanned vehicle systems Revue des systèmes de véhicules télécommandés.	3
16	9432110	Junkatsu = Journal of Japan Society of Lubrication Engineers.	3
17	22937678	Laser physics.	3
18	1762538	Polarboken.	3



# SAMPLE ILL DATA 2015 AND 2016

Photo Journal Title	Photo Jo	Photo Jo	Photo Jo	Photo Jo	Photo Jo	Photo Article Author	Photo Article Title	Cited In
Finite elements in analysis and design	1	2	August	1985	153-164	D.N. Herting	A general purpose, multi-stage, component modal synthesis method	
Kosmicheskie issledovaniia.	17		Sept-Oct	1979	727-742	Moroz, V. I.; Parfentev, N. A.; Sanko, N. F	Spectrophotometric experiment during the descent phase of Venera 11 and	NASA ADS.Moroz, V. I. (1981). The atmo
Journal of hydrologic engineering /	6			2001	377 - 381		"Normalized Antecedent Precipitation Index	Hydrological Sciences Journal
Wetlands	1	1		1981	75-86	Hackney, C. T., & de la Cruz, A. A	Effects of fire on brackish marsh communities: management implications	
Waterbirds /	35	1		2012	170-174	Chabot, D., & Bird, D. M	Evaluation of an off-the-shelf Unmanned Aircraft System for Surveying Flood	
Environment international.	16	4		1990	587-592	Brown, A. L	Measuring the effect of aircraft noise on sea birds	
Nonlinear dynamics.	20	361-380		1999		O Wallrapp and A. Shabana	Flexible multibody simulation and choice of shape functions	
Journal of system safety : a publication	49	1		2013		by Warren & Kratovil	The Safe Use of Flash Programmable Logic Devices (F-PLD) in Weapon Fuze	
Research trends /	2			1993	45-54	Pinto, O.	Recent Research on South Atlantic Magnetic AnomalyTrends in Geoph	
ACS nano.	5	1		2011	26-41	Banhart, F	Structural defects in graphene	www.isinet.com:WoK:WOS
Nano letters.	9	1		2009-01	332-337	Stolyarova, E	Observation of graphene bubbles and effective mass transport under graph	www.isinet.com:WoK:WOS
Applied physics. A, Materials science	117	4		2014-12	1659-1674	Fedorov, Andrei G.	Focused-electron-beam-induced processing (FEBIP) for emerging applicati	www.isinet.com:WoK:WOS
Canadian journal of zoology.	58	2		1980	309-312	Rownttree, V, Darling, J., et al.	Rare sighting of a right whale (Eubalaena glacialis) in Hawaii	
Cetology.	45			1982	1-19	Thompson, P.O. & Friedl, WA	A long term study of low frequency sounds from several species of whales	
International journal of knowledge m	5	3		2009	1-20	,	Organization of lessons learned knowledge	summon.serialssolutions.com
Health policy.	99	1	1	2011	1-9	Palamar, Joseph	How ephedrine escaped regulation in the United States: A historical review	
Zeitschrift für physikalische Chemie.	227	6-7	June	2013	955-981	Herbert W. Zimmermann	The Structure of Supercooled Water and the Mechanism of Homogeneous M	
Herpetological review.	17	2		1986	51-	Balazs, G. H., & Hau, S.	Geographic distribution: Lepidochelys olivacea in Hawaii	
Journal of tribology.	112	1		1990	147-152	Hess, D. P.	Friction at a Lubricated Line Contact Operating at Oscillating Sliding Velocit	www.isinet.com:WoK:WOS
Journal of herpetology	42	2		2008		Wirsing, A. J., Abernethy, R., & Heithaus,	Speed and Maneuverability of Adult Loggerhead Turtles (Caretta caretta) u	
Mechanics of structures and machines	22	3		1994	283-304	O. Wallrapp,	Standardization of Flexible Body Modeling in Multibody System Codes, Par	
Advances in computational mechanics				1994	149-158	O. Wallrapp and D. Sachau	Space Flight Dynamic Simulations Using Finite Element Analysis Results in M	
Vehicle system dynamics.	30			1998	237-256	O. Wallrapp	Flexible Bodies in Multibody System Codes	
Nanoscale.	6	24		2014	15301-15308	Pham, V	Cyclic chlorine trap-doping for transparent, conductive, thermally stable an	www.isinet.com:WoK:WOS
Heating, piping, and air conditioning.	42	?		1970	67	R. H. Liddle, J. C. Little, J. M. McIntyre, an	?	
Applied radiation and isotopes : inclu	78	?	August	2013	132-138	j.apradiso	In-situ hydrogen in metal determination using a minimum neutron source s	
Reviews in mineralogy /	60	1		2006	83-219	P. Lucey, R. L. Korotev, J. J. Gillis, L. A. Tay	Understanding the Lunar Surface and Space-Moon Interactions	
Catena.	55	2		2004-01	163-181	Fernandes, Nelson	Topographic controls of landslides in Rio de Janeiro: field evidence and mo	Elsevier:SD
Engineering geology.	69	1-2		2003-04	99-108	Guimarães, Renato	Parameterization of soil properties for a model of topographic controls on s	Elsevier:SD
Applied geography.	20	2		2000-04	95-118	Smyth, Conor	Urban landslide hazards: incidence and causative factors in Niterói, Rio de J	Elsevier:SD
Engineering geology.	88	1-2		2006-11	23-40	Gerscovich, D.M.S.	On the evaluation of unsaturated flow in a natural slope in Rio de Janeiro, E	Elsevier:SD
Circular of Astronomical Institute, Tas	124				471?	Ermolaev, B. L. Kelner, S. R., et al.	<Unknown>	
Properties of aluminum alloys : tensil								
Communications in nonlinear science	19	9	September	2014	3374-3398	Hanlun Lei , Bo XU	High-order solutions around triangular libration points in the elliptic restric	
Journal of optical and fiber communica	4	4	September	2007	225-262	David O. Caplan	Laser communication transmitter and receiver design	

IS THERE A NEW WAY TO LOOK AT  
THIS DATA WITH A FOCUS ON  
COLLECTION DEVELOPMENT?



## TOOLS



Nees Jan van Eck and Ludo Waltman  
Centre for Science and Technology Studies  
Leiden University

<http://www.vosviewer.com/>

HOW/WHY DID I SEARCH  
BY TITLE

- Most consistently available
- No DOIs for the most part

New Tool



Sublime Text Editor  
<https://www.sublimetext.com/>

## DIRTY DATA

Photo Article Author	Photo Article Title
Goldstein, J.I.	Iron meteorites: Crystallization, thermal history, parent bodies
Lewis, P; Murray, S.F; Peterson, M.	Lubricant evaluation for bearing systems operating in spatial c
AJ. Solomon and M. Antler	Mechanisms of wear of gold electrodeposits
D.M. Mattox	?
Y. Miyakawa, M Nishimura, M. Nos	?
Y. Miyakawa, M Nishimura, M. Nos	?
Y. Miyakawa, M Nishimura, M. Nos	?
R. Takagi and T. Liu	?
R. Takagi and T. Liu	?
A. Begelinger and A.W.J. De Gee	?
D. H. Buckley	?
C.L. Harris, J.E. Read, J.B. Thompson	?
C.L. Harris, J.E. Read, J.B. Thompson	?
K.E. Demorest and E.L. McMutrey	?
G.R. Kessler and G.R. Mahn	?
N. Ohmae, T. Tsukizoe and T. Naka	Ion-Plated Thin Films for Anti-Wear Applications
Zhang, Weiguo	An efficient implementation algorithm for generating de Brui

USING REGULAR EXPRESSIONS

# CLEANING IN SUBLIME

Removed all blank lines

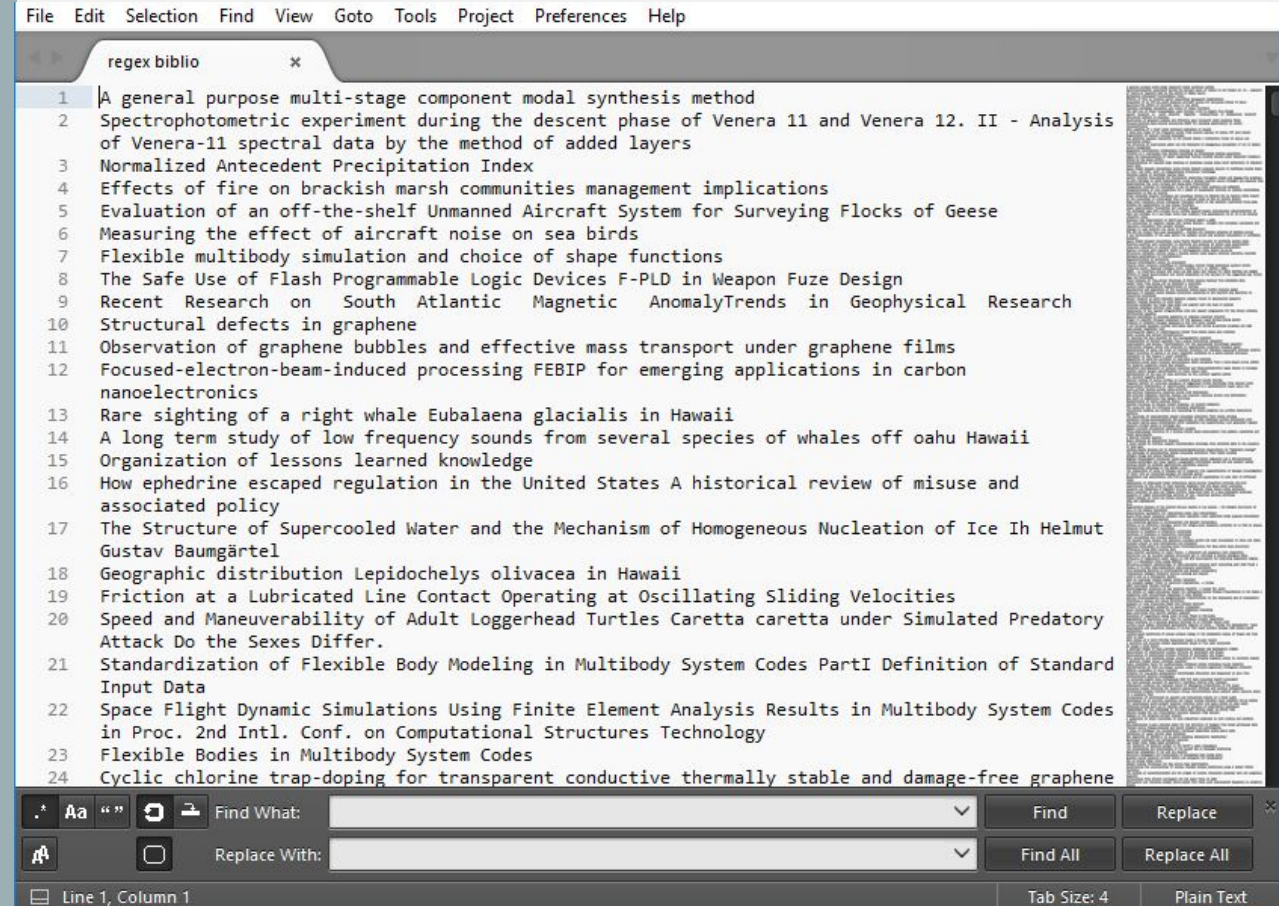
Removed duplicates

Removed all punctuation, including:

question marks, commas,

colons, parentheses, etc.

Went from 574 to 502 lines/records



```
File Edit Selection Find View Goto Tools Project Preferences Help
regex biblio x
1 A general purpose multi-stage component modal synthesis method
2 Spectrophotometric experiment during the descent phase of Venera 11 and Venera 12. II - Analysis
  of Venera-11 spectral data by the method of added layers
3 Normalized Antecedent Precipitation Index
4 Effects of fire on brackish marsh communities management implications
5 Evaluation of an off-the-shelf Unmanned Aircraft System for Surveying Flocks of Geese
6 Measuring the effect of aircraft noise on sea birds
7 Flexible multibody simulation and choice of shape functions
8 The Safe Use of Flash Programmable Logic Devices F-PLD in Weapon Fuze Design
9 Recent Research on South Atlantic Magnetic Anomaly Trends in Geophysical Research
10 Structural defects in graphene
11 Observation of graphene bubbles and effective mass transport under graphene films
12 Focused-electron-beam-induced processing FEBIP for emerging applications in carbon
  nanoelectronics
13 Rare sighting of a right whale Eubalaena glacialis in Hawaii
14 A long term study of low frequency sounds from several species of whales off oahu Hawaii
15 Organization of lessons learned knowledge
16 How ephedrine escaped regulation in the United States A historical review of misuse and
  associated policy
17 The Structure of Supercooled Water and the Mechanism of Homogeneous Nucleation of Ice Ih Helmut
  Gustav Baumgärtel
18 Geographic distribution Lepidochelys olivacea in Hawaii
19 Friction at a Lubricated Line Contact Operating at Oscillating Sliding Velocities
20 Speed and Maneuverability of Adult Loggerhead Turtles Caretta caretta under Simulated Predatory
  Attack Do the Sexes Differ.
21 Standardization of Flexible Body Modeling in Multibody System Codes PartI Definition of Standard
  Input Data
22 Space Flight Dynamic Simulations Using Finite Element Analysis Results in Multibody System Codes
  in Proc. 2nd Intl. Conf. on Computational Structures Technology
23 Flexible Bodies in Multibody System Codes
24 Cyclic chlorine trap-doping for transparent conductive thermally stable and damage-free graphene
```

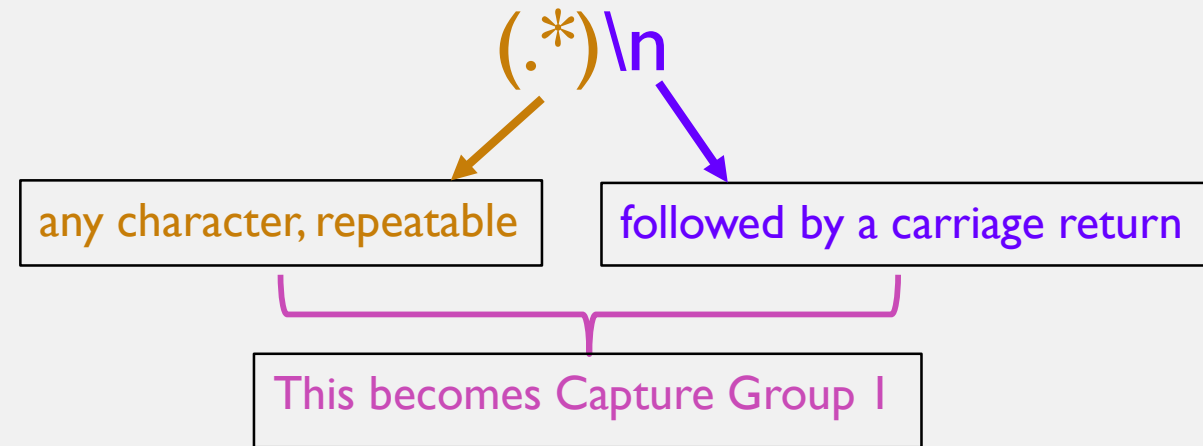


# REGULAR EXPRESSION GOAL

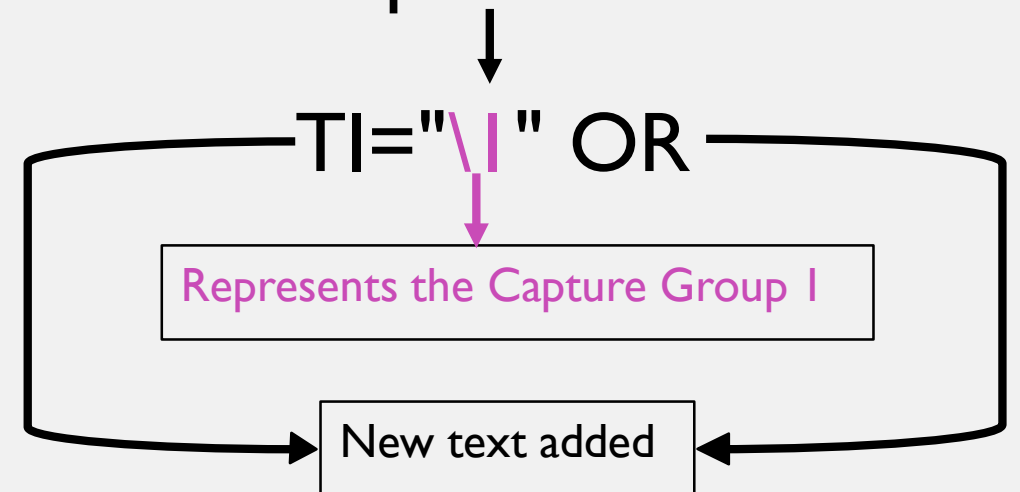
[illegible][illegible]

## WRITING THE REGULAR EXPRESSION

## Capture the Line



## Replace with



# FINAL SEARCH STRING

```
File Edit Selection Find View Goto Tools Project Preferences Help
regex biblio
1 TI="A general purpose multistage component modal synthesis method" OR TI="Spectrophotometric
experiment during the descent phase of Venera 11 and Venera 12 II Analysis of Venera11 spectral
data by the method of added layers" OR TI="Normalized Antecedent Precipitation Index" OR
TI="Effects of fire on brackish marsh communities management implications" OR TI="Evaluation of
an offtheshelf Unmanned Aircraft System for Surveying Flocks of Geese" OR TI="Measuring the
effect of aircraft noise on sea birds" OR TI="Flexible multibody simulation and choice of shape
functions" OR TI="The Safe Use of Flash Programmable Logic Devices FPLD in Weapon Fuze Design" OR
TI="Recent Research on South Atlantic Magnetic Anomaly Trends in Geophysical Research " OR
TI="Structural defects in graphene" OR TI="Observation of graphene bubbles and effective mass
transport under graphene films" OR TI="Focusedelectronbeaminduced processing FEBIP for emerging
applications in carbon nanoelectronics" OR TI="Rare sighting of a right whale Eubalaena glacialis
in Hawaii" OR TI="A long term study of low frequency sounds from several species of whales off
oahu Hawaii" OR TI="Organization of lessons learned knowledge" OR TI="How ephedrine escaped
regulation in the United States A historical review of misuse and associated policy " OR TI="The
Structure of Supercooled Water and the Mechanism of Homogeneous Nucleation of Ice Ih Helmut
Gustav Baumgärtel" OR TI="Geographic distribution Lepidochelys olivacea in Hawaii" OR
TI="Friction at a Lubricated Line Contact Operating at Oscillating Sliding Velocities" OR
TI="Speed and Maneuverability of Adult Loggerhead Turtles Caretta caretta under Simulated
Predatory Attack Do the Sexes Differ" OR TI="Standardization of Flexible Body Modeling in
Multibody System Codes PartI Definition of Standard Input Data" OR TI="Space Flight Dynamic
Simulations Using Finite Element Analysis Results in Multibody System Codes in Proc 2nd Intl Conf
on Computational Structures Technology" OR TI="Flexible Bodies in Multibody System Codes" OR
TI="Cyclic chlorine trapdoping for transparent conductive thermally stable and damagefree
graphene" OR TI="Insitu hydrogen in metal determination using a minimum neutron source strength
and exposure time" OR TI="Understanding the Lunar Surface and SpaceMoon Interactions" OR
TI="Topographic controls of landslides in Rio de Janeiro field evidence and modeling" OR
TI="Parameterization of soil properties for a model of topographic controls on shallow
landsliding application to Rio de Janeiro" OR TI="Urban landslide hazards incidence and causative
factors in Niterói Rio de Janeiro State Brazil" OR TI="On the evaluation of unsaturated flow in a
natural slope in Rio de Janeiro Brazil" OR TI="Highorder solutions around triangular libration
points in the elliptic restricted threebody problem and applications to low energy transfers" OR
TI="Laser communication transmitter and receiver design" OR TI="The Mattagami Lake Mine Archean
ZnCu sulfide deposit Quebec hydrothermal coprecipitation of talc and sulfides in a seafloor brine
pool evidence from geochemistry 18 O 16 O and mineral chemistry reply " OR TI="Response Time
Measurements in ShortWave Infrared HgCdTe eAPDs" OR TI="The interaction of negative charge with
```

Line 1, Column 16697

Tab Size: 4 Plain Text

GET STARTED WITH  
REGULAR EXPRESSIONS

- <https://regexr.com/>
- <https://regex101.com/>
- Use Google for help writing Regular Expressions

# ADVANCED SEARCH

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Use field tags, Boolean operators, parentheses, and query sets to create your query. Results will appear in the Search History table at the bottom of the page.[Learn more about Advanced Search](#)

*Example:* TS=(nanotub\* AND carbon) NOT AU=Smalley RE  
#1 NOT #2 [more examples](#) | [view the tutorial](#)

Search

Restrict results by languages and document types:

All languages

EnglishAfrikaansArabic

All document types

ArticleAbstract of Published ItemArt Exhibit Review

Booleans: AND, OR, NOT, SAME, NEAR

Field Tags:

TS= Topic

TI= Title

AU= Author [\[Index\]](#)

AI= Author Identifiers

GP= Group Author [\[Index\]](#)

ED= EditorSO= Publication Name [\[Index\]](#)

PY= Year Published

AD= Address

SG= Suborganization

SA= Street Address

PS= Province/State

ZP= Zip/Postal Code

FG= Grant Number

SU= Research Area

IS= ISSN/ISBN

PMID= PubMed ID



## SOME FALSE HITS

☐ Select Page



Save to EndNote online

Add to Marked List

Create Citation Report

Analyze Results

- ☐ 1. **The Risk Continuum of Atherosclerosis and its Implications for Defining CHD by Coronary Angiography**  
 By: Arbab-Zadeh, Armin; Fuster, Valentin  
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY Volume: 68 Issue: 22 Pages: 2467-2478 Published: DEC 6 2016  
[Full Text from Publisher](#) [View Abstract](#)

Times Cited: 2  
(from Web of Science Core Collection)  
Usage Count
- ☐ 2. **Carbonado revisited: Insights from neutron diffraction, high resolution orientation mapping and numerical simulations**  
 By: Piazzolo, Sandra; Kaminsky, Felix V.; Trimby, Patrick; et al.  
Conference: 2nd International Diamond School (IDS) on Nature of Diamonds and their Use in Earth's Study Location: Bressanone, ITALY Date: JAN, 2015  
Sponsor(s): Gemol Inst Amer  
LITHOS Volume: 265 Special Issue: SI Pages: 244-256 Published: NOV 15 2016  
[Full Text from Publisher](#) [View Abstract](#)

Times Cited: 0  
(from Web of Science Core Collection)  
Usage Count
- ☐ 3. **New generation of satellites will shed light on respiratory disease (vol 4, pg 695, 2016)**  
 By: Furlow, B.  
LANCET RESPIRATORY MEDICINE Volume: 4 Issue: 11 Pages: E55-E55  
Published: NOV 2016  
[Full Text from Publisher](#)

Times Cited: 0  
(from Web of Science Core Collection)  
Usage Count
- ☐ 4. **50 years of space research in Europe: a bibliometric profile of the European Space Agency (ESA)**  
 By: Eito-Brun, Ricardo; Ledesma Rodriguez, Maria  
SCIENTOMETRICS Volume: 109 Issue: 1 Pages: 551-576 Published: OCT 2016  
[Full Text from Publisher](#) [View Abstract](#)

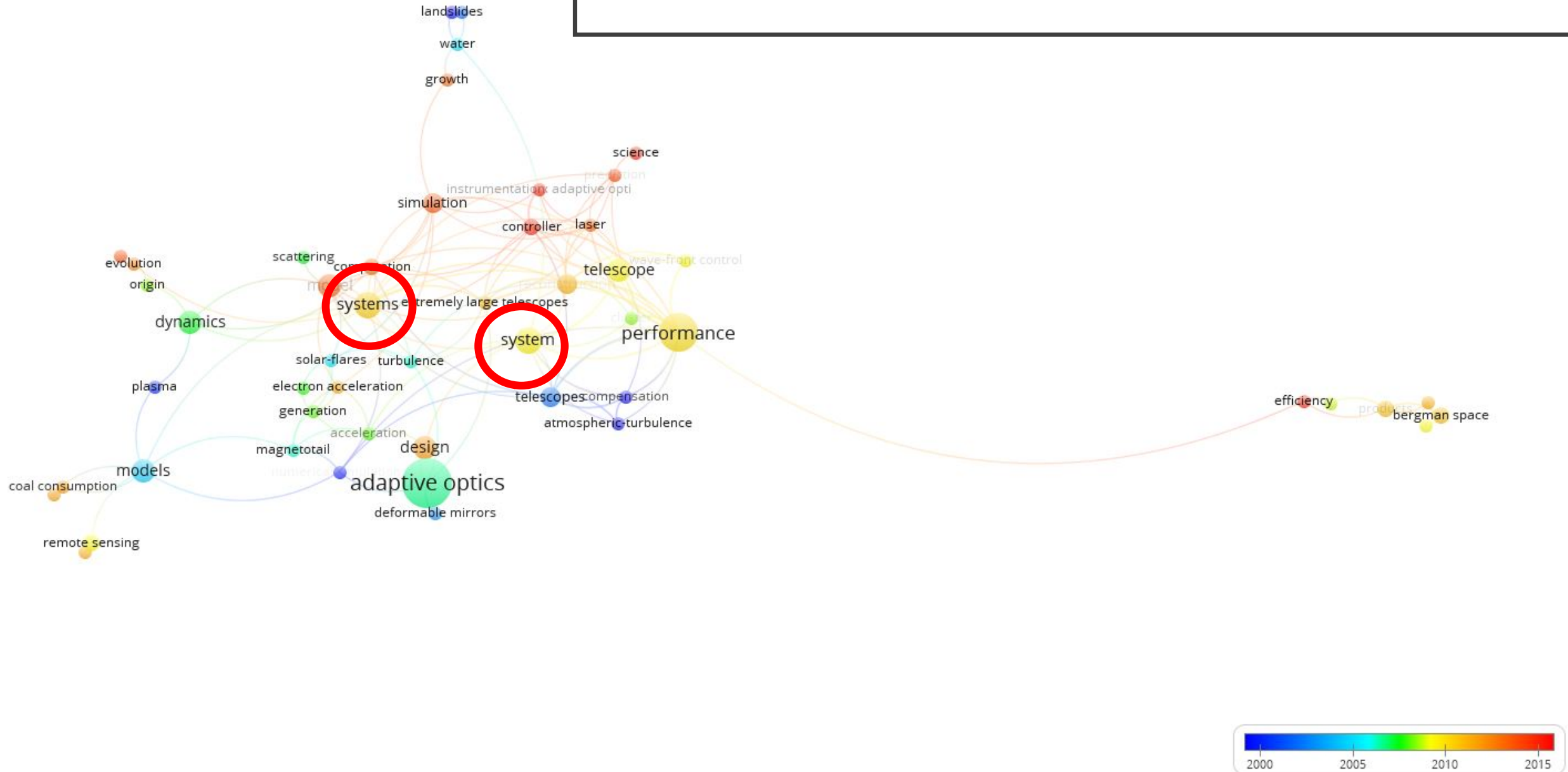
Times Cited: 0  
(from Web of Science Core Collection)  
Usage Count
- ☐ 5. **Sediments in the Gakkel Ridge rift zone (Arctic Ocean): structure and history**  
 By: Rekant, P. V.; Gusev, E. A.  
RUSSIAN GEOLOGY AND GEOPHYSICS Volume: 57 Issue: 9 Pages: 1283-1287  
Published: SEP 2016  
[Full Text from Publisher](#) [View Abstract](#)

Times Cited: 0  
(from Web of Science Core Collection)  
Usage Count

SAVE YOUR SEARCH

- Register for an Endnote account
  - Save your search
  - Export the full records
  - Total records, down from 502 turned out to be 310
- 
- What does your Web of Science Subscription cover?

# MINIMUM OF 3 KEYWORD OCCURRENCES COLORED BY YEAR



# USING OPEN REFINE

<http://openrefine.org/>

# OPEN REFINE

Combine author keywords and keywords plus

## Cluster & Edit column "ID"

This feature helps you find groups of different cell values that might be alternative representations of the same thing. For example, the two strings "New York" and "new york" are very likely to refer to the same concept and just have capitalization differences, and "Gödel" and "Godel" probably refer to the same person. [Find out more ...](#)

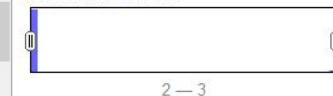
Method key collision

Keying Function fingerprint

56 clusters found

Cluster Size	Row Count	Values in Cluster	Merge?	New Cell Value
3	15	<ul style="list-style-type: none"><li>• <a href="#">adaptive optics</a> (12 rows)</li><li>• <a href="#">Adaptive optics</a> (2 rows)</li><li>• <a href="#">ADAPTIVE OPTICS</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="adaptive optics"/>
2	2	<ul style="list-style-type: none"><li>• <a href="#">TEXAS</a> (1 rows)</li><li>• <a href="#">Texas</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="TEXAS"/>
2	2	<ul style="list-style-type: none"><li>• <a href="#">EXPOSURE</a> (1 rows)</li><li>• <a href="#">exposure</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="EXPOSURE"/>
2	2	<ul style="list-style-type: none"><li>• <a href="#">SUPERPLASTIC BEHAVIOR</a> (1 rows)</li><li>• <a href="#">superplastic behavior</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="SUPERPLASTIC BEHAVIOR"/>
2	2	<ul style="list-style-type: none"><li>• <a href="#">REDHEADS</a> (1 rows)</li><li>• <a href="#">redheads</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="REDHEADS"/>
2	3	<ul style="list-style-type: none"><li>• <a href="#">turbulence</a> (2 rows)</li><li>• <a href="#">TURBULENCE</a> (1 rows)</li></ul>	<input type="checkbox"/>	<input type="text" value="turbulence"/>

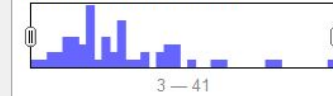
# Choices in Cluster



# Rows in Cluster



Average Length of Choices



Length Variance of Choices



Select All Unselect All

Export Clusters

Merge Selected & Re-Cluster

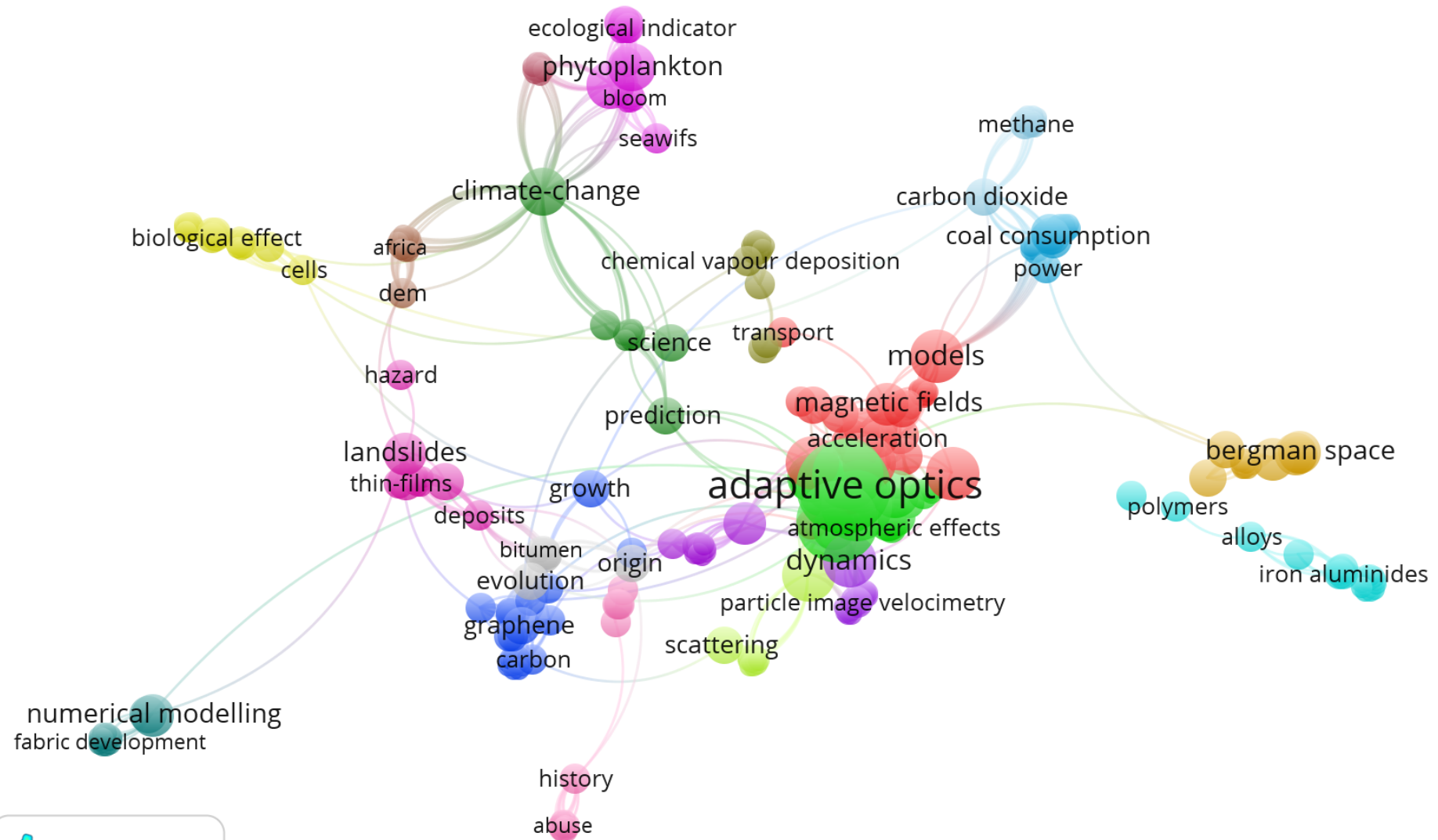
Merge Selected & Close

Close

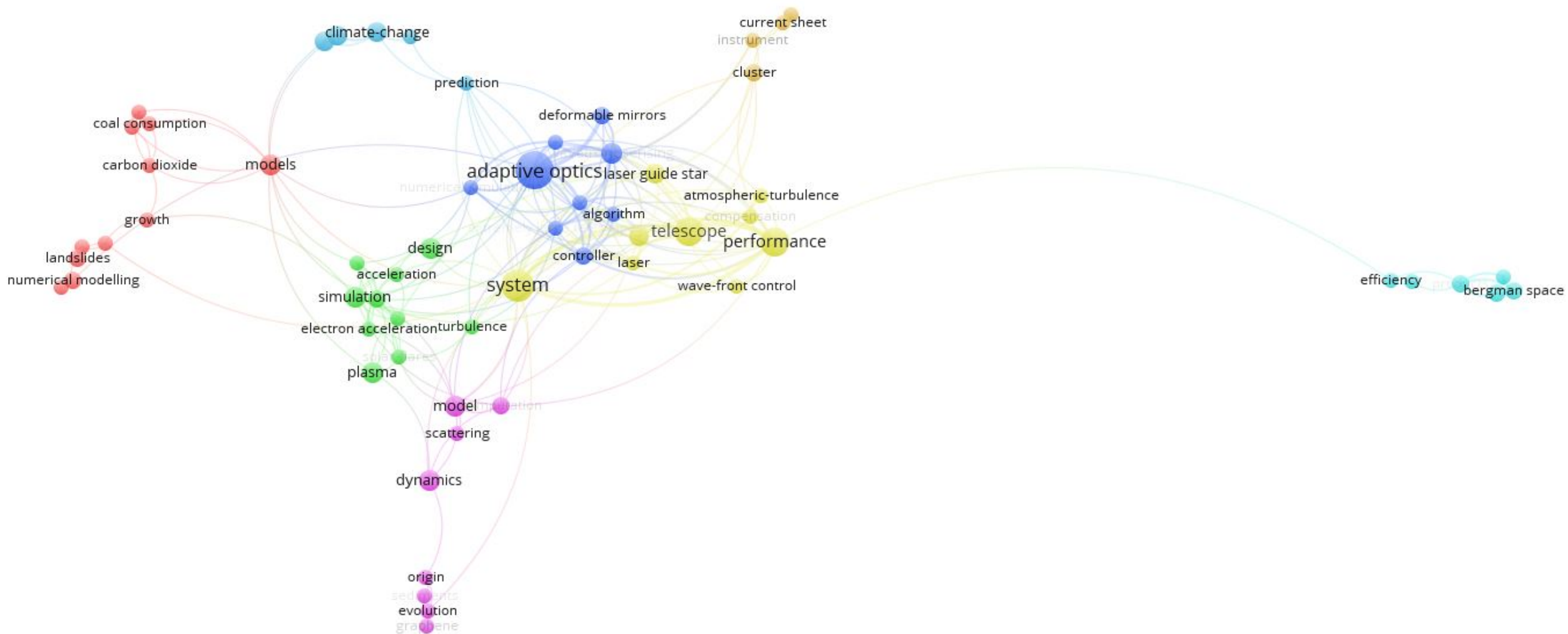


# VISUALIZATIONS

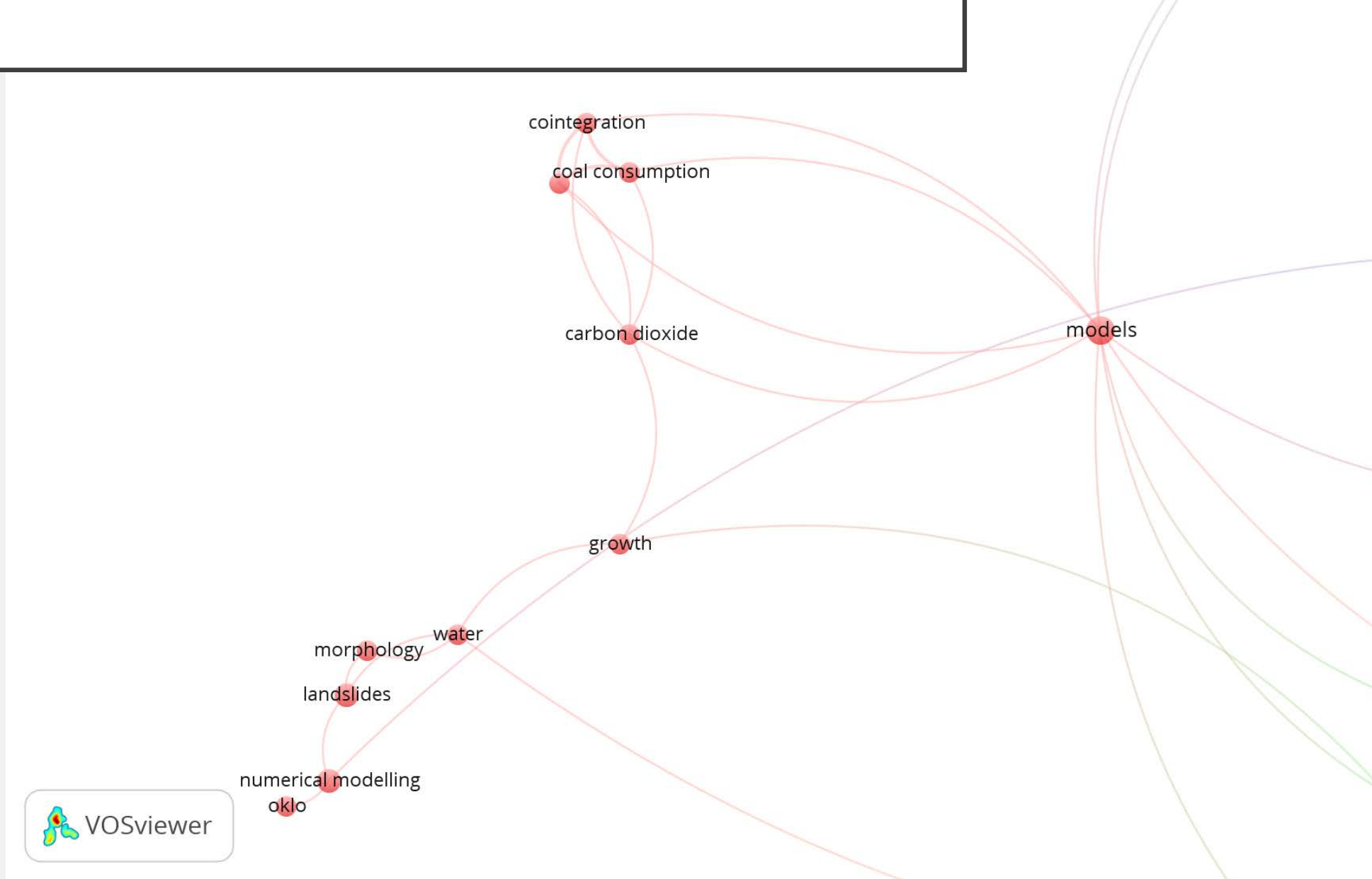
# EVERY KEYWORD



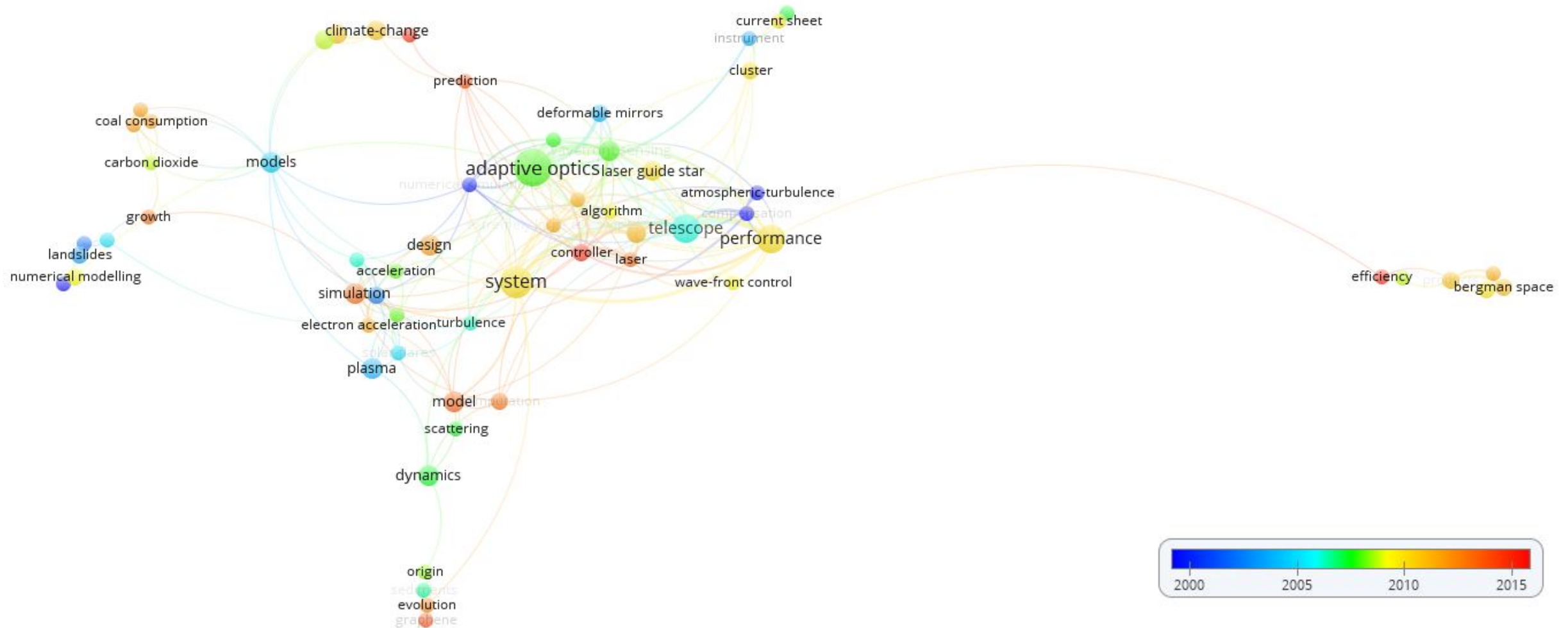
# 3 KEYWORDS COLORED BY CLUSTER



# ZOOMING IN ON A SECTION

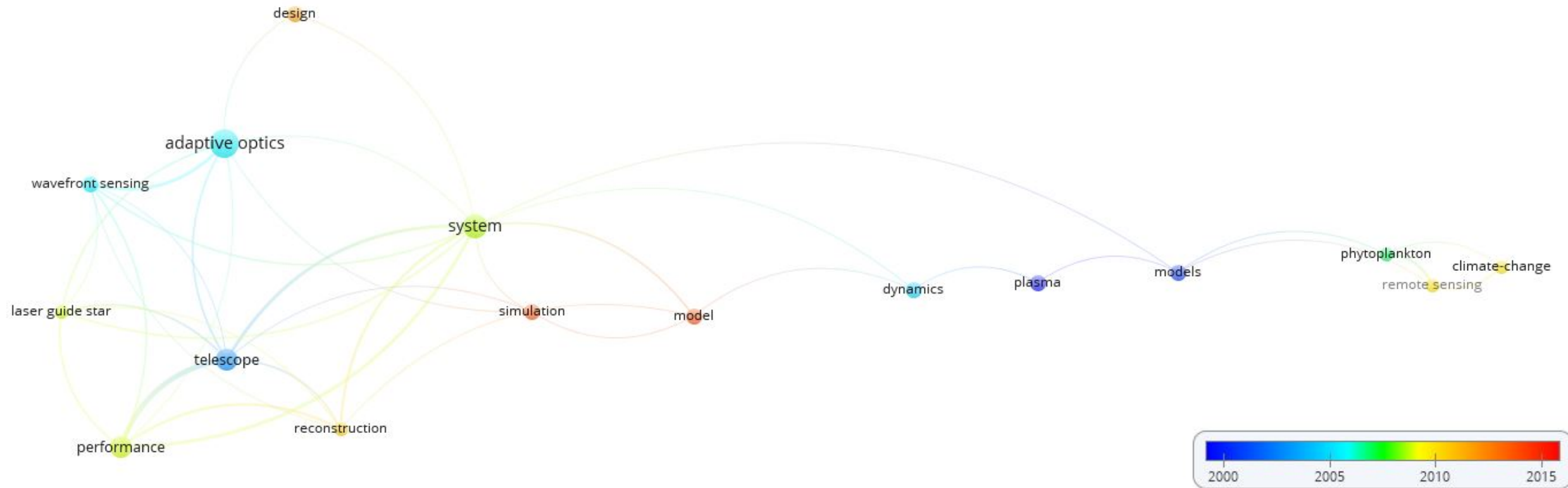


# 3 KEYWORDS COLORED BY YEAR

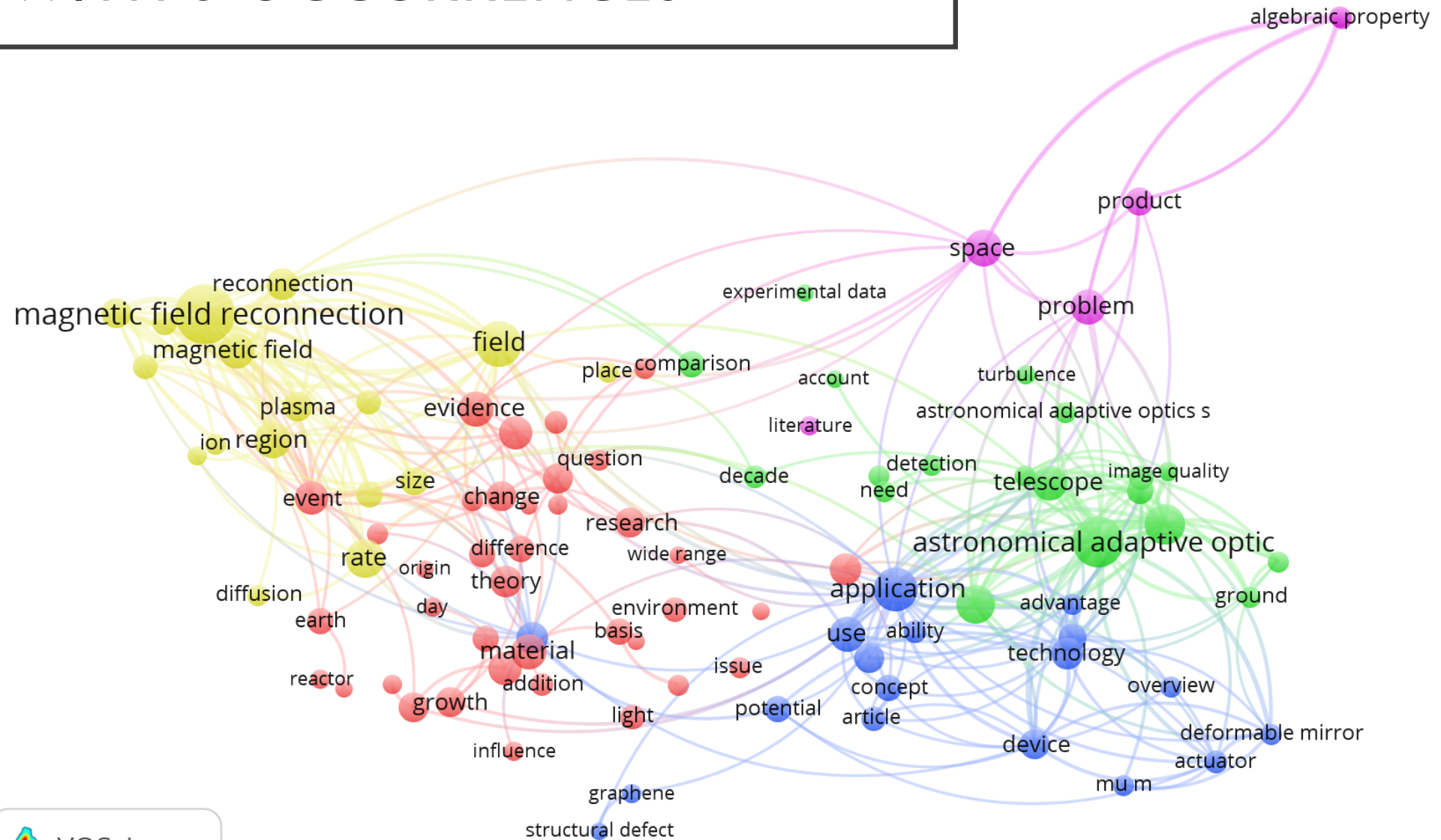




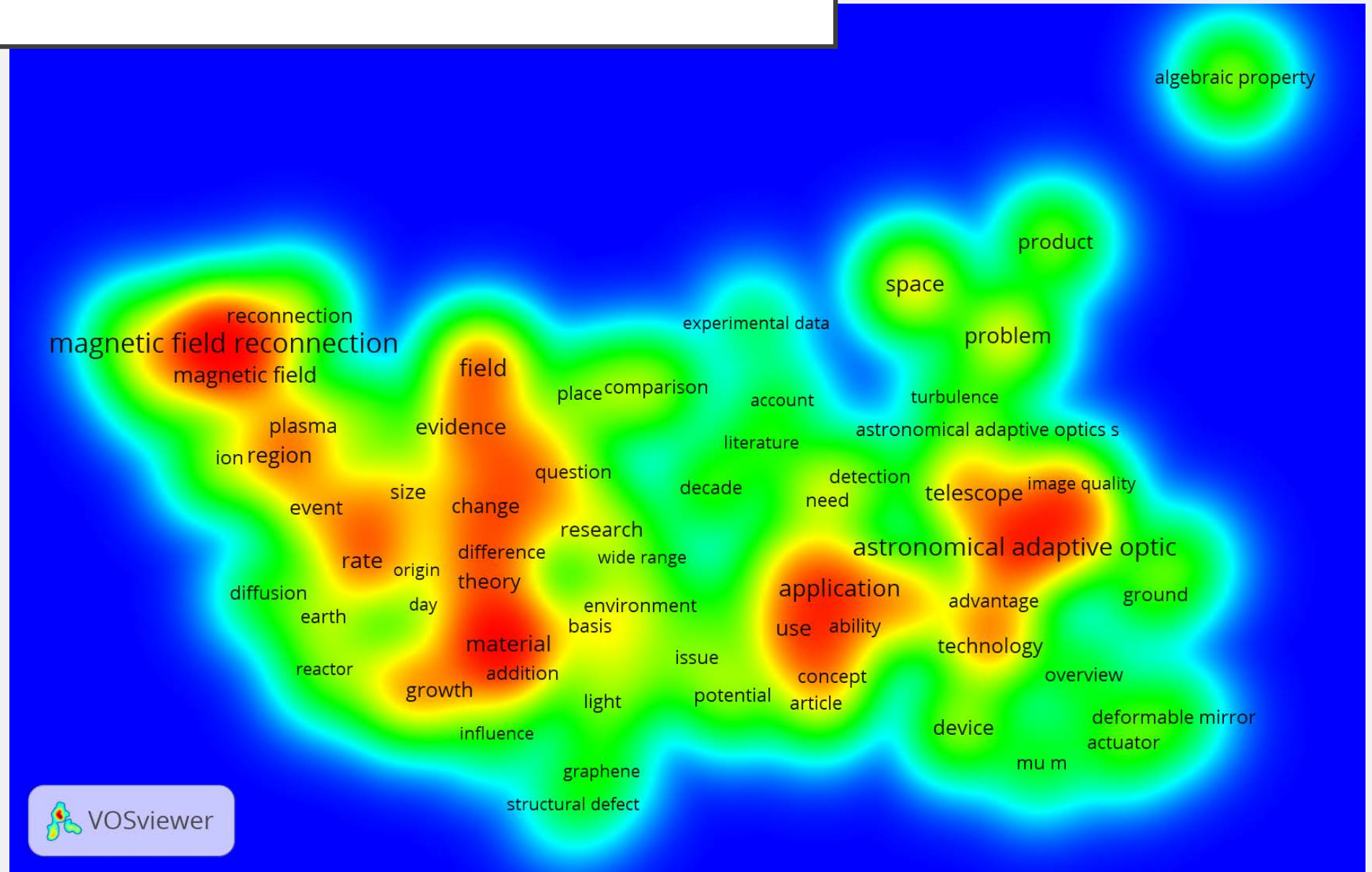
# 5 KEYWORDS COLORED BY YEAR



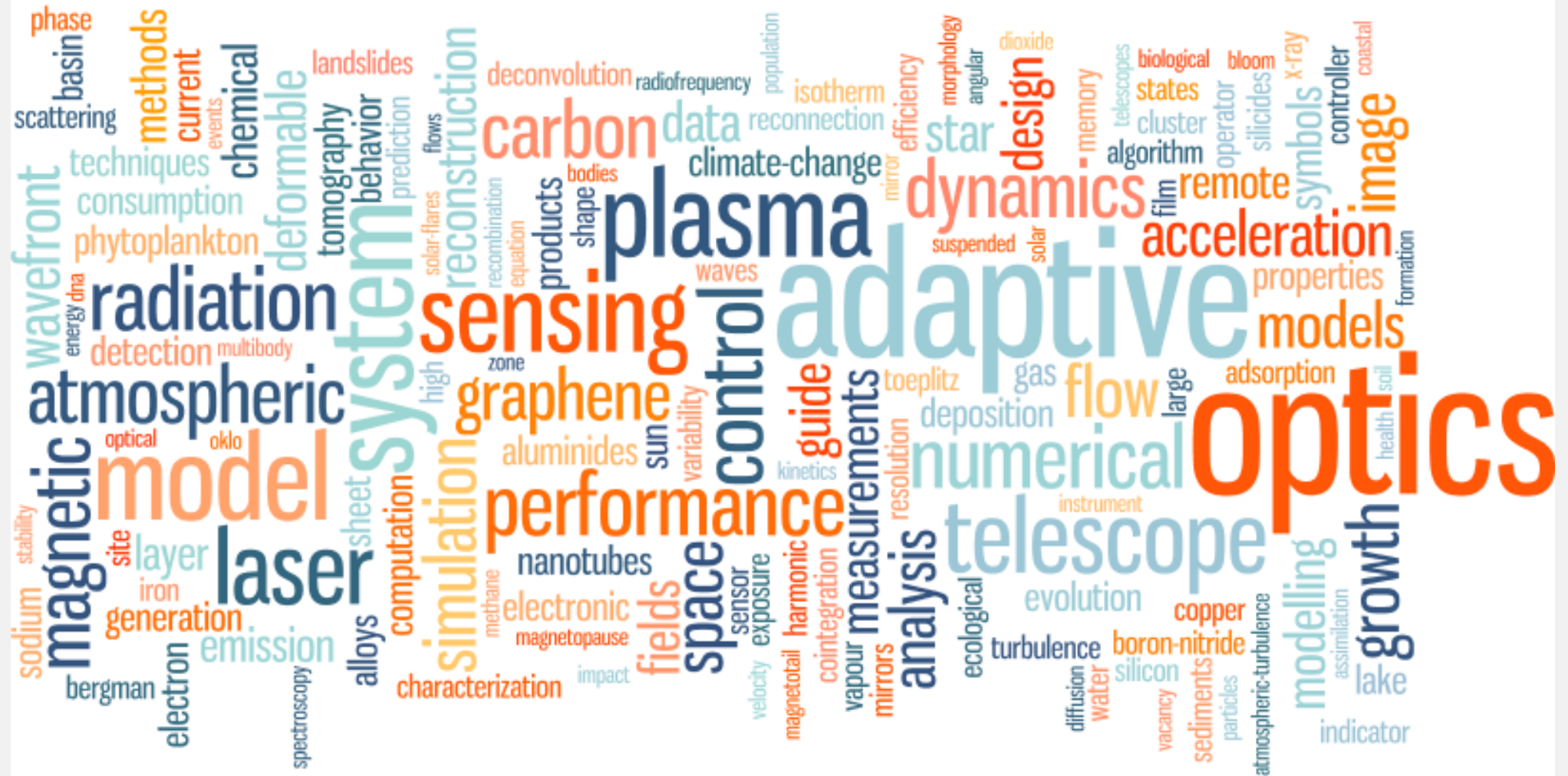
# TEXT MINING TITLE AND ABSTRACT WITH 5 OCCURRENCES



# TEXT MINING DENSITY VIEW



# KEYWORD WORDLE



# CONCLUSIONS

SOME THINGS TO LOOK  
OUT FOR

- Trial and error in the process
- False hits in data
- Your data is only as good as your subscription (in my case to Web of Science)
- Reminder: This is only one metric



## BENEFITS

- Presenting ILL Data in a new engaging way
- Using flexible tools to manipulate data for a variety of uses
- Drawing new conclusions beyond spreadsheets
- A way to look at your data topically, moving beyond traditional metrics and engaging new stakeholders
- Visually appealing

QUESTIONS?

Brynne Norton  
brynne.s.norton@nasa.gov  
Information Services Team Lead  
NASA Goddard Space Flight Center  
Cadence Group

