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Quantitative Data Analysis of Water Concept in English Water Management Metadiscourse

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Summary. This paper deals with the comparative analysis of the possibility to apply both linguo-cognitive and quantitative methods in the study of structure of mental units, e.g. concepts. The current research continues our overall and integrated study of English ecological discourse and is the next in a number of logical research series of this scientific challenge (Ковалик 2017; Ковалик, Тимочко 2018). The study object of this paper is *WATER* concept in English water management metadiscourse. The research is carried out on the basis of the original text of *the EU Water Framework Directive 2000/60 / EC*. The aim of the paper is not only to conduct a frame-based analysis of *WATER* concept using Svitlana Zhabotynska's methodology of conceptual analysis (Жаботинська 1999) but also to analyse the concept occurrences in the researchable metadiscourse. In the present investigation, the conceptual structure of *WATER* concept is modelled through basic frame schemas and is considered as an open system. The research takes a new look at the application of linguo-cognitive and quantitative data analyses in the study of *WATER* concept in English water management metadiscourse.

Keywords: discourse, metadiscourse, concept, frame analysis, quantitative data analysis.

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Introduction

The present work continues the gradual study of the ecological discourse in English scientific conceptual sphere, which was started by the authors (Ковалик 2017; Ковалик 2018). Attention is focused on the study of water management metadiscourse in the synthesized ecological and economic subdiscourse[1] (Ковалик 2017).

In previous studies, the targeted frame modelling of the ecological and economic *WATER* concept in English metadiscourse was carried out using the original methodology for conceptual analysis by the Ukrainian researcher Svitlana Zhabotynska (Ковалик 2018); the primary conceptual model of the ecological and economic *WATER* concept in the investigated metadiscourse was constructed. It was reproduced in the form of a branched system with a frame structure (Ковалик 2018). The study was conducted on the basis of the English text of the EU Water Framework Directive 2000/60/EU.

To expand the range of research and conduct a more comprehensive analysis of the ecological and economic *WATER* concept in English water management metadiscourse, we involve elements of the quantitative analysis to ensure the accuracy of the results and to determine the occurrences of the study object.

The combination of the conceptual and quantitative analyses allows us to consider the ecological and economic *WATER* concept in a coherent, quantitatively verified picture of its functioning in ecological and economic subdiscourse, displaying systemic links between the elements of its frame structure. After all, language is a systemic phenomenon, so the use of quantitative analysis in the investigation of language phenomena is rightful and justified.

The research is believed to be *of considerable interest* due to: the general orientation of modern linguistic research towards the study of specific types of discourse in English scientific conceptual sphere; the lack of a comprehensive analysis of water management metadiscourse in the synthesized ecological and economic subdiscourse; the importance of forming a holistic conceptual and categorical framework of ecological discourse in English scientific conceptual sphere; the insufficient knowledge of the application of linguistic and quantitative methods for analysing the verbalized ecological and economic *WATER* concept in English water management metadiscourse.

The paper takes a new look at the comprehensive study of the ecological and economic *WATER* concept in English water management metadiscourse as there is a small number of works devoted to this issue.

The study object is English water management metadiscourse; *the research subject* is quantitative data analysis of *WATER* concept in English water management metadiscourse.

The aim of the study is to identify and analyse quantitative data of the ecological and economic *WATER* concept in the investigated metadiscourse. In order to achieve the

[1] The previous studies have modelled and characterized an integrated and unified organization of ecology and natural resources subdiscourse with the idea to create a comprehensive understanding of the structure and functioning of ecological subsystems of different hierarchical levels. The working hypothesis was that ecology and natural resources subdiscourse is described as a superframe and it is an important part of the intrasystem and hierarchical structure of a complex frame "ecological discourse".

goal, we need: 1) to quantify and describe the basic characteristics of *WATER* concept in the metadiscourse under study; 2) to summarize data in the form of frequency tables and graphs.

The text corpora of our study is the original (English) text of the EU Water Framework Directive 2000/60/EU, a total of *22,241 words*, in which *873* examples of the use of *WATER* concept were recorded.

Methodological tools

In our opinion, the methodology of a comprehensive study of concepts implies an integrated approach. It covers traditional, cognitive and discursive methods as well as quantitative data analysis. The methodology of comprehensive concept analysis and the integrated approach to its study make it possible to reveal various linguistic means of representing a concept, to trace the frequency of its usage in discourse and, as a result, to highlight features of the content and structure of a concept. In current scientific studies, the use of certain research procedures and a number of methods depend on the aim of a particular study.

A comprehensive concept study involves the revealing of linguistic means to denote the concept and the analysis of methods to examine it. There are traditional methods: the continuous sampling method – the selection of studied nominations; the definitional and component analysis – for determining basic meanings of a concept name; the contextual analysis – for identifying linguistic means of representing a concept; the structural and semantic analysis – for structural and semantic classification of language means to denote a concept, etc. There are also cognitive and discursive methods: the conceptual analysis – for modelling and describing concepts; the interpretive and textual analysis – for singling out discursive fragments of the study object; the methods of frame modelling – for building a frame model of a concept, etc.

In current linguistic and cognitive studies, quantitative data analysis is widely used. It can reveal the laws of language and speech structure. Quantitative data analysis greatly deepens our knowledge and understanding of the specific character of English scientific conceptual sphere and allows us to trace the relationship between linguistic units, to determine the probability and selective nature of their co-occurring use. According to Creswell (2002), quantitative analysis is the process of collecting, analyzing, interpreting, and writing the results of a study. Stefan T. Gries (2003) noted that over the past years, linguistics had taken a decidedly quantitative turn. The role of qualitative linguistics is now to unveil corresponding phenomena, to describe them systematically, and to find and formulate laws, which explain the observed and described facts. Welman et al. (2005: 211) argue that data analysis by means of quantitative techniques assists us in investigating variables as well as their effect, relationship and their patterns of involvement within our world. Babbie and Mouton (2005: 418) state that the quantification of data is necessary when statistical analysis is desired, and further, the observations describing each unit of analysis must be transformed into standardised, numerical codes for retrieval and

manipulation by machine (e.g. computer). Such Ukrainian authors as Левицкий (1989, 2003, 2004), Огуй (2015), Перебийніс (1967, 2002), Гороть (1996), Білинський (2006), Єсипенко (2017a; 2017b) and others have worked fruitfully in this direction.

At the same time, quantitative data analysis turns raw numbers into meaningful data through the application of rational and critical thinking. It also includes the calculation of frequencies of variables and differences between them. Under these circumstances, we agree with Єсипенко (2017a; 2017b) that the use of quantitative data analysis provides the possibility to deviate from the logically intuitive description of a concept. The analysis of vocabulary definitions only or non-recurrent use of a concept in a limited context can cover just some aspects of what is the essence and specific character of a concept (Єсипенко 2017b). Since language is a sign system, the application of quantitative data analysis for its study is reasonable, justified and rational.

However, quantitative data analysis by itself cannot explain comprehensively and completely the mechanism of conceptualization of concepts in discourse. Therefore, the use of cognitive and discursive methods in combination with quantitative methods as complementary research tools are effective in the domain of cognitive linguistics. Applying the two opposite methods, one must clearly understand their key differences, especially in the study of complex mental but linguistically expressed constructions (Єсипенко 2017b).

Among the methods of researching concepts in modern scientific literature, the method of frame modelling is a priority. The latest investigations display a growing tendency to treat the concept as a structurally complex phenomenon with discrete interrelated and interdependent parts (for instance, Cruse 1986; Evans 2007; Fillmore, Atkins 1992; Lakoff, Johnson 1999; Ungerer, Schmid 1996; and many others). Fillmore and Atkins (1992: 76–77) believe that lexical meaning "can be understood only with the reference to a structured background of experience, beliefs, or practices, constituting a kind of conceptual prerequisite for understanding the meaning". The conceptual frames that inhabit our cognitive unconscious contribute semantically to the meanings of words and sentences (Lakoff, Johnson 1999: 116); hence, a word is defined in relation to the frame in which it is embedded. Evans summarizes a frame as "a schematisation of experience (a knowledge structure), which is represented at the conceptual level and held in long-term memory and which relates elements and entities associated with a particular culturally embedded scene, situation or event from human experience" (2007: 85).

To examine the structure of WATER concept, we consider the frame analysis as the most relevant method of conceptual analysis (Langacker 1987; Nuyts, 1993) based on frames modelling techniques (Zhabotynska 2010). Frame semantics defines a frame as "a system of categories structured in accordance with some motivating context" (Fillmore 1982). To extend this idea, Zhabotynska (2010) suggests that the very foundation of our information system is structured by several highly abstract basic frames, where the most fundamental categories of thought are arranged in accordance with the way we perceive things of the experiential world. Analysis of multiple lexical, derivational, and syntactic data (Жаботинская 2013) makes it possible to presume that the basic frames are five in number: *the Thing Frame*, *the Action Frame*, *the Possession Frame*, *the Identification Frame*, *and the*

Comparison Frame (Zhabotynska 2010). Such a construction makes it possible to display information, knowledge and experience with the analysed concept compactly.

Linguistic and quantitative methods, on the other hand, classify linguistic phenomena, calculate them, and even construct complex models based on quantitative data with an explanation of the results obtained. Therefore, the use of cognitive and discursive methods is perceived rather as a basis for identifying the descriptive aspects of language and for providing examples to support one or another hypothesis. At the same time, we are of the opinion that quantitative studies specify some observations and hypotheses, establish certain patterns, and determine the probability of a certain linguistic phenomenon.

Thus, in order to apply the quantitative methods for analysing the ecology and economic *WATER* concept in English water management metadiscourse, we use raw and descriptive data of our previous studies obtained as a result of applying Svitlana Zhabotynska's methodology of conceptual analysis (Ковалик 2018).

Quantitative Data Analysis of *WATER* concept

To achieve the main goal of the study – to identify and analyse linguistic and quantitative data of *WATER* concept – the analysis is carried out in three stages, each stage is self-sufficient and can be considered as separate. Thus, the present work is mainly devoted to the first stage of our comprehensive study, namely the revealing of general patterns of quantitative data analysis of the ecological and economic *WATER* concept in English water management metadiscourse. It involves four steps: (1) *quantitative observation*, that is, collection of the primary body of data; (2) *summarizing and systematizing* the results of observation; (3) *calculation of the summarizing indicators* of the phenomenon under study, and (4) *analysis* of the summary and calculation materials, drawing preliminary conclusions and forecasting their further application.

In order to reproduce the research algorithm at the level of the quantitative observation, we suggest taking a look at the English text of the *EU Water Framework Directive 2000/60/EC* (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy as the main source of the text corpora for our investigation. The *EU Water Framework Directive 2000/60/EC* sets out the main (framework) principles of management and the ways to achieve good water quality, as well as the safe state of rivers and reservoirs in Europe, and prescribes the main provisions for the protection and improvement of the status of water resources by the EU countries (and candidate countries) and for the promotion of their sustainable balanced use.

1. Conceptual analysis of WATER concept

From the analysis of the text corpora, according to Svitlana Zhabotynska's methodology of conceptual analysis, the logical predicates (found in the context of English water management metadiscourse) were thematically grouped on the ground of basic propositional schemas:

(1) the qualitative schema: **[47 uses]** "WATER is SUCH-QUALITY": such in terms of freshness / salinity [22]: *freshwater(s) [8]; fresh surface water [2]; transitional waters [11]; saline waters [1];* such in terms of quality [2]: *good quality water [1]; etc.;* such in terms of intended use [16]: *drinking water [11]; recreational waters [1]; bathing waters [2]; receiving groundwater [1]; water intended for human consumption [1];* such in terms of abundance of shellfish [1]: *shellfish waters [1]*; such in terms of the result of human activity [5]: *waste-water [4]; the resulting water [1];* such in terms of effectiveness [1]: *water-efficient (technologies) [1];*

(2) the locative schema [298 uses] "WATER is / exists / acts THERE / LC-locative (place)": place = beneath Earth's surface [153]: *groundwater(s) [153];* place = Earth's surface [113]: *surface water(s) [113];* place = a coast [13]: *coastal waters [13];* place = inland [5]: *inland water(s) [4]; etc.;* place = sea / ocean [4]: *marine waters [4];* place = a city or town [1]: *the urban waste-water [1];* place = country(-ies) [9]: *water(s) in the Community [2]; Community waters [3]; territorial waters [3]; transboundary water [1];*

(3) the mode of existence schema [3 uses] "WATER exists SO-mode of being (form of existence)": form of existence = standing or flowing [2]: *standing or flowing water [1]; etc.;* form of existence = rain [1]: *rainwater [1];*

(4) the state / process schema[1] [8 uses] "AG-WATER acts": *groundwaters do not fully follow a particular river basin [1]; water needs [1]; waters achieving a status [1]; waters showing evidence of major alterations [2]; inland waters flowing into them [1]; the resulting water will meet the requirements of Directive [1]; freshwaters needing protection or improvement [1];*

(5) the state / process schema[1] + locative [1 use] "AG-WATER acts /makes THERE / LC": *inland water flowing for the most part on the surface of the land [1];*

(6) the contact schema[1] [88 uses] "AG-somebody acts upon PT-patient / AF-affected WATER": *water use(s) [9]; protection of water(s) [5]; pollution of water [4]; injection of water [2]; the abstraction of drinking water [2] ;direct discharges to groundwater [1]; impoundment of fresh surface water [1]; abstraction and recharge of groundwater [1]; the quality required of shellfish waters [1]; sampling and analysis of surface water [1]; waste-water treatment [1]; groundwater characterization [1]; augmentation of groundwater bodies [1]; loss of water [1]; water transfer and diversion [1]; risks to waters [1]; water is stored [1]; production of drinking water [1]; supply and demand for water [1]; Member States should identify waters [1]; reinjection of pumped groundwater [1]; the impact of human activity on groundwaters [1]; water is affected or used [1]; in securing good water quality [1]; etc.;*

(7) the contact schema[1] + goal [10 uses] "AG-somebody acts upon / makes PT-patient / AF-affected WATER because of GL-goal": *waters used for the abstraction of drinking water [2]; the protection of marine waters from pollution [1]; injection of water for technical reasons [1]; the protection of Community waters in terms of quantity and quality [1]; water abstraction for urban*, *industrial*, *agricultural and other uses [1]; water intended for human consumption [2]; etc.;*

(8) the contact schema[1] + mediative [3 uses] "AG-somebody acts upon / makes PT-patient / AF-affected WATER with MD-mediative": mediative = substances, pollutants, discharges [3]: *pollution of water by those substances [1]; pollution of water by individual pollutants or groups of pollutants [1]; surface waters affected by discharges of those substances [1];*

(9) the contact schema[1] + locative [4 uses] "AG-somebody acts upon / makes PT-patient / AF-affected WATER THERE / LC-place": place = river basin district [2]: *coastal waters shall be identified and assigned to the nearest or most appropriate river basin district or districts [1]; etc.;* place = another type of water [2]: *the water used may be derived from any surface water or groundwater [1]; etc.;*

(10) the contact schema[2] [3 uses] "AG-something / somebody acts upon PT-patient / AF-affected WATER": *similar activities on, or in the ground which come into contact with groundwater [1]; water-saving (irrigation techniques) [1]; etc.;*

(11) the contact schema[3] [1 use] "AG-WATER acts upon PT-patient / AF-affected": *habitats and species directly depending on water [1];*

(12) the part-whole schema[1] [294 uses] "WH-WATER has PR-part": part = body(-ies) [173]: *a/the body(-ies) of water [49]; surface water body(-ies) [21]; etc.;* part = status [70]: *water status [9]; the status of water [8]; groundwater chemical status [7]; etc.;* part = breadth [2]: *the breadth of territorial waters [2];* part = quality [13]: *the quality of the water(s) [3]; freshwater quality [2]; etc.;* part = flow conditions [1]: *natural flow conditions of water [1];* part = chemical composition [2]: *the chemical composition of water [1]; etc.;* part = flow(s) [13]: *groundwater flows [6]; flow of groundwater [1]; etc.;* part = level [5]: *groundwater level(s) [4]; etc.;* part = resource(s) [6]: *water resources [3]; etc.;* part = volume [2]: *volume of groundwater [1]; etc.;* part = quantity [4]: *freshwater quantity [2]; quantities of groundwater [1]; etc.;* part = outer limit [1]: *the outer limit of transitional waters [1];* part = balance [1]: *water balances [1];* part = course [1]: *a water course [1];*

(13) the part-whole schema[2] [43 uses] "WH-whole has PR-part WATER": whole = sector [1]: *the water sector [1];* whole = management [3]: *water management [2]; etc.;* whole = legislation [2]: *water legislation [1]; etc.;* whole = monitoring network [7]: *the groundwater monitoring network [4]; etc.;* whole = regulation [2]: *water regulation [2];* whole = ecosystems [1]: *surface water ecosystems [1];* whole = ecoregions [1]: *ecoregions for transitional waters and coastal waters [1];* whole = service(s) [11]: *water services [10]; etc.;* whole = standards [1]: *standards may be set for water [1];* whole = policy [14]: *water policy [9]; policy on water [1]; etc.;*

(14) the inclusion schema[1] [48 uses] "CR-container WATER has CT-content": content = releases [1]: *indirect releases into water [1];* content = systems [1]: *water systems [1];* content = type(s) [20]: *water type [2]; surface water body type(s) [17]; etc.;* content = category [6]: *surface water category(-ies) [6];* content = substances [5]: *the priority substances in surface water [1]; hazardous substances to water [1]; daphnia or representative organisms for saline waters [1]; etc.;* content = stratification characteristics [1]: *stratification characteristics of the groundwater [1];* content = discharge(s) and

emission(s) [3]: *discharge into surface water [1]; etc.;* content = objectives [2]: *the environmental objectives for surface waters [1]; etc.;* content = pollutant(s) [7]: *pollutant(s) in(to) groundwater [2]; etc.;* content = problem(s) [1]: *transboundary water problems [1];* content = price [1]: *water-pricing policies [1];*

(15) the inclusion schema[2] [5 uses] "CR-container has CT-content WATER": container = aquifer [2]: *aquifer of water [1]; etc.;* container = abstraction point(s) [1]: *Drinking water abstraction points [1];* container = treatment plant [1]: *a waste-water treatment plant [1];* container = collection and treatment facilities [1]: *waste-water collection and treatment facilities [1];*

(16) the personification schema [11 uses] "ID-WATER is PS-personifier (proper name)": *"Surface water"*, *"Groundwater"*, *"Inland water"*, *"Transitional waters"*, *"Coastal water"*, *"Water intended for human consumption"*, *The Drinking Water Directive [2]; The Bathing Water Directive [1]; The Urban Waste-water Treatment Directive [1]; the United Nations Convention on the protection and use of transboundary water courses and international lakes*, *approved by Council Decision 95/308/EC(15) [1];*

(17) the characterization schema [4 uses] "ID-WATER is CH-characterizer": *the water [2]; such waters [2];*

(18) the likeness / metaphor schema [2 uses] "CV-WATER is as if MT-correlate": *Water is not a commercial product [1]; Water is a heritage [1].*

2. Occurrence of WATER concept

The findings of this study indicate that in English water management metadiscourse the number of verbalized ecological and economic *WATER* concept totals *873*. A quantitative data analysis of *WATER* concept is stratified and presented in Table 1.

Table 1. Frequency table of *WATER* concept in English water management metadiscourse

Concept	Type of Frame	Frame Schemas	Total Number of Uses in Schema	Dominant Characteristics of *Water* Concept in Schema [number]	Share of Usage in Schema, %
WATER	Thing Frame	the qualitative schema: "WATER is SUCH-QUALITY"	47	such in terms of freshness / salinity [22]*	46.8
		locative schema: "WATER is / exists / acts THERE / LC-locative (place)"	298	place = beneath Earth's surface [153]	51.3
		mode of existence schema: "WATER exists SO-mode of being (form of existence)"	3	form of existence = standing or flowing [2]	66.7
	Action Frame	state/process schema[1]: "AG-WATER acts"	8	–**	12.5
		state/process schema[1] + locative: "AG-WATER acts/makes THERE / LC"	1	–	100
		contact schema[1]: "AG-somebody acts upon/ makes PT-patient / AF-affected WATER"	88	*water use(s)* [9]	10.2

Concept	Type of Frame	Frame Schemas	Total Number of Uses in Schema	Dominant Characteristics of *Water* Concept in Schema [number]	Share of Usage in Schema, %
WATER	Action Frame	contact schema[1] + goal: "AG-somebody acts upon / makes PT-patient / AF-affected WATER because of GL-goal"	10	*waters used for the abstraction of drinking water* [2]	20
		contact schema[1] + mediative: "AG-somebody acts upon / makes PT-patient / AF-affected WATER with MD-mediative"	3	mediative = substances, pollutants, discharges [3]	100
		contact schema [1] + locative: "AG-somebody acts upon / makes PT-patient / AF-affected WATER THERE / LC-place"	4	place = river basin district [2]; place = another type of water [2]	50
		contact schema[2]: "AG-something / somebody acts upon PT-patient / AF-affected WATER"	3	–	33.3
		contact schema[3]: "AG-WATER acts upon PT-patient / AF-affected	1	*habitats and species directly depending on water* [1]	100
	Possession Frame	part-whole schema[1]: "WH-WATER has PR-part"	294	part = body(-ies) [173]	58.8
		part-whole schema[2]: "WH-whole has PR-part WATER"	43	whole = policy [14]	32.6
		inclusion schema[1]: "CR-container WATER has CT-content"	48	content = type(s) [20];	41.7
		inclusion schema[2]: "CR-container has CT-content WATER"	5	container = aquifer [2]	40
	Identification Frame	personification schema: "ID-WATER is PS-personifier (proper name)"	11	*the Drinking Water Directive [2]*	18.2
		characterization schema: "ID-WATER is CH-characterizer "	4	*the water [2]; such waters [2]*	50
	Comparison Frame	likeness / metaphor schema: "CV-WATER is as if MT-correlate"	2	*water is not a commercial product [1]; water is a heritage [1].*	100

* The number of dominant characteristics in the scheme
** The absence of dominant characteristics in the scheme

Analysis and discussion of findings

Let us begin to substantiate the main steps of our study and interpret the quantitative data of *WATER* concept. At the level of *quantitative observation*, the ecological and economic *WATER* concept in English water management metadiscourse was singled out. The next step – *summarizing and systematizing* the results of study – enabled a quantitative stratification of water concept according to the frame schemas, while at the level of *calculating of the summarizing indicators* it became possible to summarize the total number of uses and to calculate the use of dominant characteristics of *WATER* in the frame schemas (see Table 1).

The obtained results have led us to conclude that the most frequent use of the ecological and economic *WATER* concept is found in two of the five types of frames – the Thing Frame (348 uses) and the Possession Frame (390 uses). Within the Thing Frame, the locative schema is quantitatively predominant: "WATER is / exists / acts THERE / LC-locative (place)" with the total number of uses 298 and with the significant dominant characteristics of the investigated concept by location (place) – beneath Earth's surface (153 uses). At the same time, the part-whole schema[1]: "WH-WATER has PR-part" with a total number of uses – 294 is quantitatively prevailing within the Possession Frame with significant dominant characteristics of *WATER* concept by body(-ies) of water (173 uses).

Simultaneously, let us draw attention to the complete absence of the dominant characteristics of *WATER* concept in the three of the eighteen frame schemas that belong to the Action Frame, namely: the state / process schema[1]: "AG-WATER acts"; the state / process schema[1] + locative: "AG-WATER acts / makes THERE / LC" and the contact schema[2]: "AG-something / somebody acts upon PT-patient / AF-affected WATER". Explanations are found in the equilibrium characteristics of the concept under study in a particular schema. As an example, consider the contact schema[2]: "AG-something / somebody acts upon PT-patient / AF-affected WATER" (3 uses) with equilibrium characteristics of *WATER* concept – *low water requiring crops* (1 use)*; similar activities on*, *or in the ground which come into contact with groundwater* (1 use)*; water-saving (irrigation techniques)* (1 use).

Thus, the current study helped us to delineate and reveal the general patterns of quantitative use of *WATER* concept in English water management metadiscourse.

Moreover, it should be noted that the tabular form of presenting quantitative data does not always allow us to depict the general picture of the phenomenon visually and clearly and to reveal the regularities of quantitative indicators or their distribution. Therefore, along with the frequency tables, a graphical way of displaying the values is used as a way of visual representation and generalization of the data obtained.

Using the summarized data to confirm the results, we reproduced graphically the obtained quantitative data of *WATER* concept verbalization in frame schemas (see Figure 1).

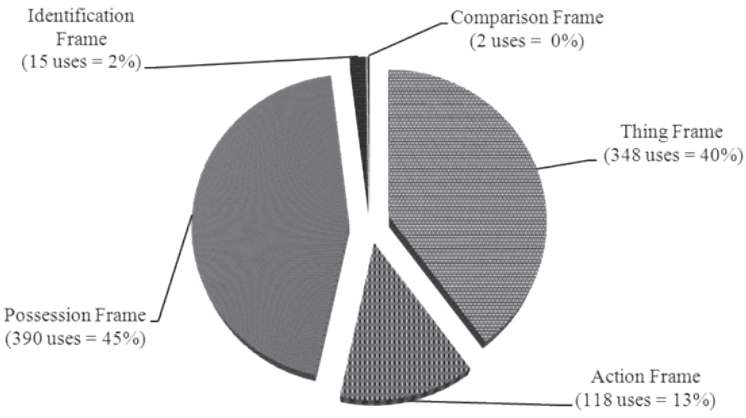

Fig. 1. Segmental stratification of WATER concept in English water management metadiscourse

Conclusion

In this paper, we have tried to scrutinize and to interrelate a number of analyses for research (mostly conceptual and quantitative) and attempted to show the usefulness of such a methodology. We have also highlighted issues of text corpora as sources of quantitative data. The important role of the quantitative data analysis and its interaction with the conceptual one have been described and exemplified.

The methodology of this study has been developed to answer the following: (1) the ecological and economic *WATER* concept in the investigated metadiscourse is an open system with interacted and complemented components which form a complex frame structure; (2) in water management metadiscourse the number of *WATER* concept totals 873; (3) the most frequent use of *WATER* occurs in two of the five types of frames – the Thing Frame (348 uses) and the Possession Frame (390 uses); (4) the locative schema: "WATER is / exists / acts THERE / LC-locative (place)" is quantitatively prevailing with the total number of uses – 298 and the part-whole schema[1]: "WH-WATER has PR-part" with the total number of uses – 294; (5) the complete absence of dominant characteristics of *WATER* can be traced in the three frame schemas, namely: the state / process schema[1]: "AG-WATER acts"; the state / process schema[1] + locative: "AG-WATER acts / makes THERE / LC" and the contact schema[2]: "AG-something / somebody acts upon PT-patient / AF-affected WATER".

The obtained results enable us to acquire the corpora data of concept verbalization for further interpretation. The analysis of the text corpora showed the dominance of water as "the most common mineral" (Вернадський 2012)[2] in the environment, in terms of its location "WATER is / exists / acts THERE / LC-locative (place)": "waters, located in the pores and cracks of the rocks in various states and forms (underground waters) and waters of the dry land, permanently or temporarily on the Earth's surface in the form of various water bodies (surface waters)"[3] (Вовк 2012–2019). At the same time, the dominant characteristics of water as a water mass are traced ("WH-WATER has PR-part"), which is "the simplest stable chemical compound of hydrogen with oxygen and is very common in nature. It is a colourless liquid, odourless and tasteless. It has homogeneous physical and chemical characteristics, formed under the influence of geological and climatic

[2] The geochemist, Volodymyr Vernadsky has only recently become recognised internationally, despite being regarded as one of the greatest names in the science of the 20th century. His most important work *"The Biosphere"* was only translated into English in 1997. This work defines the biosphere as a unifying, holistic concept for the earth system at a time when reductionism was the main driving motivation in scientific research. Another work entitled *"The History of Natural Waters"* also deserves similar attention. This work explores many concepts in hydrogeology, geochemistry, and especially biology in which water is described as an integral part of the biosphere.

[3] *води, що знаходяться в порах і тріщинах гірських порід в різних станах і формах (підземні води) та води суходолу, що постійно або тимчасово перебувають на земній поверхні у формі різних водних об'єктів (поверхневі води)* 'vody, shcho znakhodiatsia v porakh i trishchynakh hirskykh porid v riznykh stanakh i formakh (pidzemni vody) ta vody sukhodolu, shcho postiino abo tymchasovo perebuvaiut na zemnii poverkhni u formi riznykh vodnykh obiektiv (poverkhnevi vody)'.

conditions. It is classified by chemical properties, the composition of impurities, origin, location, etc."[4] (Вовк 2012–2019).

Accordingly, the use of cognitive and discursive methods along with the quantitative data analysis in the study of concepts provides background for an objective and reliable data of the facts that the researcher uses. These interrelated methods do not open a new perspective on the study of the concept verbalization in a particular discourse but are also a reliable tool for penetration into hidden for external observation conceptual structures and their verbal projections (cognitive mapping).

The lines of further research are seen in generating the descriptive statistics for WATER concept in its two main dimensions: measures of central tendency and measures of spread. It helps us to convert concise summaries of the numbers as a whole into easily digestible data.

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[4] *дуже поширена в природі найпростіша стійка хімічна сполука гідрогену з оксигеном. Безбарвна рідина без запаху і смаку. Має однорідні фізико-хімічні характеристики*, *сформовані під впливом геологічних і кліматичних умов. Класифікується за хімічними властивостями*, *складом домішок*, *походженням*, *місцем знаходження тощо* 'duzhe poshyrena v pryrodi naiprostisha stiika khimichna spoluka hidrohenu z oksyhenom. Bezbarvna ridyna bez zapakhu i smaku. Maie odnoridni phizyko-khimichni kharakterystyky, sformovani pid vplyvom heolohichnykh i klimatychnykh umov. Klasyfikuietsia za khimichnymy vlastyvostiamy, skladom domishok, pokhodzhenniam, mistsem znakhodzhennia toshcho'.

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