Record of science technologies. I. Online journal

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Abstract. The development of technologies for record of science is one of the important parts of the current revolution in science. i.e. transition to the so-called "Fourth paradigm" for science. Scientific article today involves the insertion of modern data display and analysis, dynamic and interactive components, as well as compatibility with the latest modern systems of indexing and dissemination of scientific content. This article examines the concept and results of R&D in the electronic publishing area carried out in the Geophysical Center RAS, which has more than half a century history of publications in geophysics, in particular the results of research on international geophysical projects, and active participation in international activity in this field.

Introduction

Articles and books containing the results of research in geosciences are among the most complex types of scientific publications. This is due to the fact that most of it, along with the text (often only a small portion of the volume of publications), also presents a complex mathematical and/or chemical text, graphics, often voluminous and complex that requires equipping articles with various means of visualization and multimedia.

$\mathcal{ELXpaper}$ (ELectronic eXtended paper style) – LaTeX package is designed for journals and books published by Geophysical Center RAS. The package is an extension of the standard class article.cls and supports two-column journal format, internal and external active hyperlinks, monitoring "anchor-target" compliance and generating error or warning messages while the source translation. The result is presented in DVI and PDF formats of translated document, as well as in XML meta descriptions of published documents for registering the latter with CrossRef (in accordance with the XML Schema CrossRef 4.3.3.) and loading to Scientific Electronic Library (eLIBRARY.RU) (in accordance with the XML Schema eLibrary CE 7.1.4.1284).

Software Environment

Taking into account the above-mentioned features of publications in geosciences, LaTeX publishing system seems to be the most preferable[1]. Particularly interesting is the ability to generate XML meta descriptions for index systems simultaneously with the generation of `jobname.pdf`, `jobname.dvi` and other auxiliary files during translation of the original text of the article, typed in LaTeX. This translation requires an expansion of the standard LaTeX class (`article.cls` or `book.cls`) with the set of macros that describe the semantic definitions included in the corresponding XML schemas.

This package is the component part of software developed for supporting full cycle of article's preparation and publication, from writing and marking up LaTeX source file to generation PDF, HTML, and EPUB3 versions of the article. We aimed to minimize an amount of work at preparatory stage, i.e. markups, composition, hyperlinking, etc., as well as minimize staff quali-

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[1]For a complete acquaintance with the possibilities of LaTeX publishing system and its numerous extensions one should refer to the well-known works [*Lamport,* 1994; *Goossens et al.,* 1993; *Mittelbach et al.,* 2006; and others]

fication at the TEXnician level (as defined by D. Knuth [1992]).

An example of such a solution was proposed by the author [2011] and has been successfully used as a basic tool for publication of GC RAS journals. LATEX simpletexml package provided generation "on the fly" XML meta descriptions for the so-called CrossRef response page.

Unfortunately, LATEX as a programming language is not universal. Output XML files can be easily generated from the input stream if all semantically important elements are defined directly. If the sets of these elements are presented in the LATEX source file as fragments of a relational base with a number of cross-referenced links, or the source file includes multilanguage fragments, generated XML files require postprocessing using programming or scripting tools. It should be emphasized that this approach is not universal and can not, in particular, be considered as a way to convert any arbitrary LATEX document into its XML version.

This article is an attempt to write a three-fold document which is (i) an article describing concept and approach to creating an effective tool for online publishing, (ii) a sample of article produced using this tool, and (iii) a template for authors and typesetters.

Considered here $\mathcal{ELXpaper}$ package retains a number of components of the `simpletexml` package, but significantly extends the capabilities of providing, besides other things, the generation of meta descriptions in accordance with the eLIBRARY.RU XML Schema. The package also contains a number of macros required for conversion of the source LaTeX document to XHTML/EPUB3 formats.

The problem of converting LaTeX source files to ebooks is actually the problem of converting LaTeX to XHTML. The last step – arranging the XHTML into EPUB3 archive – is rather obvious. Correct converting LaTeX to XHTML in general case is not possible, even theoretically, because TeX/LaTeX generically is not SGML-compatible. The partial solution can be found if we restrict the used LaTeX style to fixed list of commands and redefine some of them (those which have semantical meaning) to emulate XML-compatible structure. At the same time we can ignore commands which have no semantical meaning and used only for presentational needs. They should be replaced with CSS definitions developed for any particular journal, book, etc.

With these limitations creating of not so comprehensive converting software becomes possible. The sample of such solution is realized by author [2015] and

was successfully used for converting "in one click" the LaTeX source file of this article to PDF, HTML5, and XHTML/EPUB3.

Perhaps even more important factor is that the documents published in XML-compatible format are more suitable for machine processing in indexing and reference systems, at least at a representative level.

Packet Structure and the Basic Options

Packet Structure

$\mathcal{ELX}paper$ package extends and modifies article.cls class and represented as LaTeX file elxpaper.sty. Additional style files are called directly from the package $\mathcal{ELX}paper$ except hyperref package, which is called from the preamble of translated articles for easy switch on/off of some options of hyperref package, in particular, disable generating PDF table of contents when working with text in a language not supported by the current version of Adobe Reader. The package defines the following components and commands:

- formation of the title page;

- processing of lists of authors and organizations;

- processing of abstracts and output initialization;

- processing of the structural elements of the article (sections of three levels, application and so forth);

- processing of list environments including numbered and non-numbered lists and sublists;

- processing of list of references generated in formats compatible with CrossRef and eLIBRARY.RU XML Schemas;

- processing of "floating" components (figures and tables), including their orientation;

- generation internal and external links in accordance with the journal style;

- generation parameters and markers for multipass processing of LaTeX files;

and macros that are included in the preamble of LaTeX version of the article, and commands used for CrossRef and eLIBRARY.RU metadata.

Generation of Article Metadescription.

For this purpose the set of macros, comprising the steps of creating and opening files `jobname.xml` (for Cross-Ref) and `jobname-neb.xml` (for eLIBRARY.RU) are

followed by recording elements in them, selected from the input data stream into a two- or three-step process of translation of the document (article). Supported in LaTeX opportunity of multipass translation allows to avoid including in the original document of some secondary values, such as the number of pages, authors, affiliations, and other elements necessary for the correct formatting of the article, considering, in particular, the syntax used for language (in our case, English and Russian). In general, this process takes place "behind the scenes", XML files are created along with other additional files (`jobname.pdf`, `jobname.aux`, etc.).

Hyperlinks to Internal and External Objects

based on macro definitions of `hyperref` package. Hyperlinks to internal floating objects are defined as "behind the scenes", that allows to simplify typeset and eliminate typesetting errors. The links to documents with known DOI indices are also based on `hyperref` package definitions.

Supported Styles.

$\mathcal{ELX}$paper package supports the following styles of journals:

- Geoinformatics Research Papers,

- Russian Journal of Earth Sciences,

- Geophysical Papers Online – Preprints,

- Vestnik Otdelenia nauk o Zemle RAN.

This list could easily be expanded as made, for example, in one of our first developments (package agupaper.sty).

Basic Package Options

The following options should be defined in the $\mathcal{ELX}paper$ package before it starts:

- `\pdfout{dvi|pdf}` - generating .dvi or .pdf files;

- `\xml@out{xml|noxml}` - generating .xml file in the translation process;

- `\html@out{html|nohtml}` - generating .html file (response page) in the translation process;

- `\warnmes{verbose|silent}` - sending error message on the screen to stop recording or broadcast messages only in the .log file;

- `\lang{eng|rus}` - choosing document language (English or Russian);

- \parnumber{par|nopar} - numbering or non-numbering of paragraphs;

- \hyptest{hyper|nohyp} - activating or suppressing hyperlinks.

The options' first values are set by default. Alternative options should be explicitly defined. For example, this document was translated by setting options silent,pdf,rus, par, i.e. \usepackage[silent,pdf The number and order of customizable options are arbitrary.

Both latex or pdflatex drivers can be used for translation of articles (documents) with elxpaper.sty package. Version 1.0 of the package together with a brief guide and auxiliary scripts is available on the GC RAS website dedicated to electronic publishing (elxpaper.zip).

Structure of the Paper

Article source file in LaTeX prepared for translation should have the following structure:

```
\documentclass[twoside]{article}
\usepackage[<options>]{elxpaper}
```

```
\usepackage[<options>]{hyperref}
<preamble_text>
\begin{document}
<title/author[s]/affiliation[s]>
\abstract{<abstract_text>}
<structured_article_text>
[\acknowledgement[s]{<text>}]
\begin{references}
<reference list>
\end{references}
\noreferences - used if reference list
is empty
[\appendices]
[\supplement] - section for electronic
supplement
\end{document}
```

Preamble

The preamble should include the following minimal set
of parameters:

```
\journalid{<journal_code>}{<volume>}
      {<issue>}{<publication_date>}
\cpright{<copyright_holder>}
        {<copyrigth_year>}
```

```
\paperid{<reserved_(CCC_code)>}
    {<article_number_in_issue>}
\papertype{<article_type = RAR|EDI|REV|ABS|
 REP|COR|MIS} % required by eLibrary Schema
\papercode{<DOI_suffix>}
\lefthead{<running_head_(first_author)>}
\righthead{<running_head_(short_title)>}
\received{<day>}{<month>}{<year>}
[\revised{<day>}{<month>}{<year>}]
\accepted{<day>}{<month>}{<year>}
\published{<day>}{<month>}{<year>}
\indexterms{<keywords_from_standard_list>}
\authaddr{<name_and_address_of_author[s]>}
```

Keywords defined by the author are not included in the preamble. Instead they are placed inside the article's body just before the abstract. This is due to the fact that XML schema eLIBRARY.RU requires to submit each author's keyword individually.

The `<journal_code>` is the main parameter settings, determining first, the choice of the journal from the number of supported by the package, selection fonts and composition of the title page of the article, as well as journal meta parameters such as ISSN code, et al.

Codes of the following journals are defined as follows:

BS Geoinformatics Research Papers
ES Russian Journal of Earth Sciences (RJES)
NZ Vestnik Otdelenia nauk o Zemle RAN
PO Geophysical Papers Online – Preprints
MS Manuscript (unformatted article version)

The parameter <DOI_suffix> is a string of 12 characters. The suffix may be arbitrary. Usually it is composed according to the rules set by the publisher. For GC RAS journals the first four characters – the year of acceptance of an article for publication, the fifth and sixth characters – journal code (capital letters), the last six characters – the registration number of an article. For example, DOI suffix of the original version of this article, published in Russian in December 2014 is 2014BS015.

The running head is composed of two parameters \lefthead and \righthead, defined in the preamble. Parameters \received, \revised, \accepted and \published are used to generate the imprint data.

The parameter \authoraddr contains the address(es) of authors in the following format: A. First, B. Second, First Organization, City, State/Region, Country (email address). If authors present more than one or-

ganization it is necessary to add additional instructions `\authoraddr`, whose number must match the number of organizations.

Some additional parameters, such as `\subident`, `\xmldepositor`, `\xmlregistrant` are also included in the preamble (details are given in the $\mathcal{ELX}$*paper* package).

Title Page

The main elements of the cover page are inserted after the command `\begin{document}`. Among them `\title{ <article_title>}`, set of commands describing the author(s), organization(s) and their internal links, set of keywords and the abstract content (`\abstract{<abstract_text>}`).

A description of each author includes seven parameters, of which 1–3 and 5 are mandatory, others may be absent.

```
\author{<author_number>}{<last_name>}
{<given_names_or_initials>}{[<suffix>]}
{<organisation_number>}{[<alternative_
organisation>]}{[<initials>]}
```

For example,

```
\author{1}{Bender}{Ostap-Suleyman
    Berta-Maria}{}{1}{}{O.-S. B.-M.}
\author{2}{Jonson}{Joe H.}{}{2}{}{J. H.}
```

or
```
\author{1}{Bender}{O.-S. B.-M.}{}{1}{}{},
\author{2}{Allen}{J. H.}{}{2}{}{},
```

Here <suffix> – name suffix, e.g., Jr., Esc. and the like.

The description of each organization consists of five parameters, all of them except the fourth one, are mandatory, for example,

```
\affil{<organisation_number>}{<organisation>}
{<city>}{<[region/state]>}{<country>}
```

Below is an example of authors' block description. Some complexity of the structure of the block is caused by the necessity to transfer the set of semantic elements and quantitative characteristics (number of authors, organizations, etc.) to the TEX engine. The TEX engine does not allow to provide character-wise analysis, moreover, the system does not work with arrays. In the process of interpreting the input stream, we need, on the one hand, to ensure independent processing of

input (semantic) elements, without which it is impossible to construct a valid `jobname.xml` file, on the other, to format grammatically correct strings (with the correct punctuation) before these strings will be sent to an output stream. This problem can be solved by the two-step translation. At the first step the basic syntactic structure is determined by the analysis of input parameters, which are written then into `jobname.aux` file, at the second step, with the use of TeX registers, semantically and syntactically correct line of authors, organizations, string citation lists of referred literature, etc. are formed.

```
\author{1}{First}{A. B.}{}{1}{}{}
\author{2}{Second}{C. D.}{}{2}{}{}
\author{3}{Third}{E. F.}{}{3}{4}{}
\author{4}{Fourth}{G. H.}{}{5}{6}{}
\author{5}{Fifth}{I. J.}{}{1}{}{}
%
\affil{1}{Institute or Irreproducible
       Physics}{Bigcity}{}{Gallardia}
\affil{2}{Institute of Cosmetic Physics}
             {Smalltown}{}{Gallardia}
\affil{3}{Center of Paranormal Studies}
           {Miraclecity}{}{Gallardia}
\affil{4}{Also at Virtual Affiliation}
```

```
                {Moon City}{}{Gallardia}
\affil{5}{Unknown Affiliation}{Somewhere}{}
    {Gallardia}
\affil{6}{Also at Institute of Cosmetic
        Physics}{Smalltown}{}{Gallardia}
```

The number of authors, which is used by template for putting commas correctly, is defined during the first translation and saved in the `.aux` file. A warning message appears on the screen and in the `.log` file with the request to repeat translation. Double translation is also necessary if the number of authors in the editing process was changed, though in this case the warning is not generated.

Numbers of reference links to affiliations should be in ascending mode, i.e. 1, 2, 3, 4, 5, but not 1, 3, 2, 4. Repeating of reference already used is possible, e.g. 1, 2, 2, 3, 4, 1. See also the sample above.

Basic and alternative addresses should be placed in the same order as in the authors' string. This is checked during the translation and warning is issued. Addresses of alternative affiliations may start with `Also at`, `Formerly at`, `On leave from`, and the like, as appropriate.

Please look at the sample above. If the same affiliation is mentioned as a basic one (for the author

Second) and as an alternative one (for the author Fourth) it should appear twice in the list of affiliations, the second time starting with `Also at`.

The command `\keywd{<value>}` refers to one or group of words and phrases that are recommended for using as arguments in the context search. Below is the block of keywords selected for this article.

```
\keywd{scientific journal}
\keywd{electronic publishing}
\keywd{information technologies}
\keywd{record of science}
\keywd{semantic inclusions}
\keywd{metadescription}
\keywd{CrossRef}
```

The `\abstract{<abstract_text>}` command is the mandatory component of the title page. At least the empty `\abstract{}` command should appear if the article has no abstract. It is necessary because this command starts the process of converting input to output and the formation of the title page. At the same time all other page elements are generated "behind the screen" using the data defined in the preamble.

Mathematical and Chemical Texts

The in-text anchors to formulas should be marked as `\eqref {<formula_number>}` without parentheses (see formula (1) as an example), the program will insert their own. Automatic numbering of formulas is allowed only in cases where the LATEX source file is used for the conversion to the PDF format only.

$$\text{Demo} \quad \text{formula} \quad -> \quad A + B = S \quad (1)$$

In cases where the LATEX source file is used for conversion it to HTML5/XHTML/EPUB3 formats, one must follow certain restrictions, namely: (i) displayed unnumbered equation should be included in

```
\begin{eqnarray*}
 ....
\end{eqnarray*},
```

while (ii) numbered equations should have a coercive numbering, i.e. corresponding target tag should be included in the

```
\begin{equation}\label{<formula_number>}
....
\end{equation}
```

Using \eqnarray* (with asterisk) for an array of unnumbered equations is allowed. The use of \eqnarray (without an asterisk) for a mixed array of numbered and unnumbered equations should be avoided, as the current version of the software for conversion TeX to MathML does not support hyperlinks in such complex structures.

Lists and Tabulated Materials

LaTeX supports basic formats of lists which are used to build a number of LaTeX's display-like environments, i.e. unnumbered (itemize), numbered (enumerate), and description (description) lists. With adding some LaTeX packages one can build rather complicated lists with inclusions of sublists and customizing the list elements. Not all of these features can be easily converted to HTML format and especially to more strong XHTML/EPUB formats.

$\mathcal{ELX}$paper package contains a few commands to support fragmented and broken lists which are not used when converting source file to PDF. Some samples of lists, which are successfully processed by our software from LaTeX source to HTML5/XHTML/EPUB3 can be seen in the article doi:10.2205/2014ES000538.

For arranging in-text tabulated materials LaTeX sug-

gests a number of formats, like `tabular`, `tabularx`, `tabulary`, etc. For converting source file to HTML we recommend to use only `tabular` environment, because HTML format has no simple and effective tools to support sophisticated tabulated fragments. Note, that in opposite to tabulated material included into the float environment, in-text `tabular` appears in the same place as it was put in the source file. See the demo sample below.

Element	1	2	3	4	5	6	7
Li	3.1	2.8	3.4	3.1	2.9	1.9	2.5
Rb	5.0	8.4	7.8	10	10	12	17
Cs	1.6	0.88	2.9	2.8	2.1	3.2	5.1
Cr	1800	1500	1100	3000	1800	900	900
Mn	790	740	690	700	660	790	710
Co	78	30	35	25	115	40	35
Ni	2000	2000	2000	1800	1900	2400	2200
Cu	25	73	25	63	90	30	20
Zn	56	91	51	74	100	73	79

Note: numerals 1 through 7 correspond to the numbers of cubes in Figure 1. (See doi:10.2205/2015ES000546)

Floating Objects

Floating objects (*floats* in LaTeX terms) are elements of articles, not having a fixed point in the text. Place of their appearance is determined by the program in the translation process in accordance with the algorithm implemented in the used class or package. The main float environments processed by the current version of $\mathcal{ELXpaper}$, are figures, tables, and panels.

In-text references to Figure 1 and Figures 1 and 2 should be marked up as \figref{1} and \figrefs{1 and 2) or \figrefs{1, 2}.

In-text references to Table 1 and Tables 1 and 2 should be marked up as \tabref{1} and \tabrefs{1 and 2) or \tabrefs{1, 2}.

In-text references to Plate 1 and Plates 1 and 2 should be marked up as \plaref{1} and \plarefs{1 and 2) or \plarefs{1, 2}.

The value in curly brackets for the expressions of the type Figure 2a, Table 3b, use only the digital part number, i.e. \figref{2}a and \tabref{3}b, since it is the numeric part of numbers used by the appropriate macro to generate "anchor-target" pairs.

Figures

Graphic files should be named in the order they are mentioned in the text, for example, f01, f02, etc. The full name of the graphic file may be arbitrary, but it is recommended to use \paperid command of the preamble as the prefix in graphics name. That is, the full name of the graphic file in the caption, i.e. the second figure of the article should be \setimage{}{}{}{<height>}{2010nz000062-f02} for \paperid{2010NZ000062}.

The sample of figure description is given below:

```
\begin{figure*}[t]      % Fig 5
\figurewidth{35pc}
\setimage{}{}{}{33pc}{2010nz000062-f05}
\caption{Areas of daily driven fire from
June to August 2010 in the European part
of Russia~(a) and the Moscow region~(b)
(``Aerocosmos'' data).}
\end{figure*}
```

The generalized command for image file insertion \setimage{<x_shift>}{<y_shift>}{<width>} {<height>}{<image_file>} requires an image file in .eps format for translation to DVI/PS or in .png format for translation to PDF format. This selection

is determined by specifying corresponding option of $\mathcal{ELX}$*paper* package. At least one value (`width` or `height`) should be given for proper scaling of image at the output. The \setimage command generates also a target mark matching to corresponding anchor incorporated into \figref command.

Tables

There is no special requirements for composing tables until you do not plan to convert LaTeX document to XHTML/EPUB3 format. In the latter case some restrictions should be taken into account.

The current converter LaTeX to XHTML/EPUB3 supports vertical or slanted text strings in tables. For rotating separate fragments of the text or table cells on arbitrary angle the environment `turnbox`, defined in the `rotating` package should be used, i.e.

```
\begin{turnbox}{<rotating angle in degrees>}
{<rotated object>}
\end{turnbox}
```

To rotate on fixed angle $\pm 90°$one can use the macro \vtcell[<direction>]{<rotated object>}, which is a simplified version of the shown above construction.

Table 1. VTCELL – Demo Table With Vertically Oriented Column Subtitles

First column	Second column	Third column	Fourth column
AAAA	BBBB	CCCC	DDDD
aaa	bbb	ccc	ddd

Parameter <direction> should have values: l to rotate to $90°$ anticlockwise, or r to rotate to $90°$ clockwise.

The demo Table 1 was built using the following code:

```
\begin{table}[b]
\tablewidth{20pc}
\caption{VTCELL--Demo table with vertically
oriented column subtitles}\vspace*{6pt}
\begin{tabularx}{20pc}{XXXX}
\hline \\[-20pt]
\vtcell[l]{First column} &
\vtcell[l]{Second column} &
\vtcell[l]{Third column} &
```

```
\vtcell[l]{Fourth column} \vspace*{-1pc}
\\[-1pc] \hline \\[-7pt]
AAAA & BBBB & CCCC & DDDD \\
aaa & bbb & ccc & ddd \\ \hline
\end{tabularx}
\end{table}
```

The environment turnbox gives much more freedom in placing subtitles and other objects. See demo Table 2 which was built using the following code:

```
\begin{table}[b]
\tablewidth{20pc}
\caption{TURNBOX--Demo table with arbitra-
ry oriented column subtitles}\vspace*{6pt}
\begin{tabularx}{20pc}{XXXXX}
\hline \\[4pc]
{\begin {turnbox}{40}{First~column}
\end {turnbox}} &
{\begin {turnbox}{50}{Second~column}
\end {turnbox}} &
{\begin {turnbox}{60}{Third~column}
\end {turnbox}} &
{\begin {turnbox}{70}{Fourth~column}
\end {turnbox}} &
{\begin {turnbox}{80}{Fifth~column}
```

```
\end {turnbox}} &
{\begin {turnbox}{90}{Sixth~column}
\end {turnbox}}
\\[4pt] \hline \\[-7pt]
AAAA & BBBB & CCCC & DDDD & EEEE & FFFF \\
aaa & bbb & ccc & ddd & eee & fff \\ \hline
\end{tabularx}
\end{table}
```

Table 2. TURNBOX – Demo Table With Arbitrary Oriented Column Subtitles

First column	Second column	Third column	Fourth column	Fifth column	Sixth column
AAAA	BBBB	CCCC	DDDD	EEEE	FFFF
aaa	bbb	ccc	ddd	eee	fff

Landscape Oriented Figures and Tables

To rotate floats (tables and figures) on $\pm 90^\circ$ the environment \sideways[figure[*]|table[*]] should be used. It is necessary to replace \begin{figure}

and \end{figure} with \begin{sidewaysfigure} and \end{sidewaysfigure} as well as \begin{table} and \end{table} with \begin{sidewaystable} and \end{sidewaystable}. For two-column floats the forms with asterisk (*) should be used, i.e. sidewaysfigure* and sidewaystable*.

The rotating package is called from elxpaper.sty with the rotating option set to [figuresright] which corresponds to rotating floats on 90°anticlockwise. If the rotating option is set to [figuresleft] floats are rotated on 90°clockwise, the latter is not recommended by the most Russian scientific journals.

Internal and External Hyperlinks

Along with the basic hyperlink commands included into hyperref package by *Sebastian Rahtz and Heiko Oberdiek* [2012], i.e. \url, \href, \hyperlink, \hypertarget, \eqref, \hyperref, \hyperdef, a few more commands are defined for internal links to floats and external links to documents with DOIs.

A few samples of links to floats are shown in the Floating Objects section, samples of external links to documents with DOIs are shown in the Reference List section.

Hyperlinks inserted by the author in the article text

must be reconciled not only for correctness of their syntax, but also on the performance, i.e. they should be checked for compliance with the URL address or DOI index of requested document. The main command for the hyperlink is `\href{<URL_address>}{<anchor_text>}`, for example, `\href {http://ebooks.wdcb.ru}{Geoinformatics Research Papers}`.

Sample 1

"... Dr. So-and-so published in Russian Journal of Earth Sciences an article related to..."

After marking up this fragment to LaTeX format we have

"...Dr. So-and-so published in `\href{http://rjes.wdcb.ru}{Russian Journal of Earth Sciences}` an article related to ...",

which then converted by `\pdflatex` engine to

"... Dr. So-and-so published in Russian Journal of Earth Sciences an article related to ..."

with the active hyperlink from PDF file to the shown address (Colored markups of internal and external hyperlinks are shown on computer screen but suppressed on print).

Sample 2

A fragment `"...data obtained from AIRS device of AQUA satellite [http://mirador. gsfc.nasa.gov] ..."`

in general case should be converted to

`"...data obtained from AIRS device of AQUA satellite [\href{http://mirador.gsfc.nasa. gov}{http://mirador.gsfc.nasa.gov}] ..."`
If both arguments of `\href{<target_address>} {<anchor_text>}` are equal the command `\href{}{}` can be replaced with the command `\url{<target_ address>}`

Both fragments, namely

`"...data from AIRS AQUA [\href{http:// mirador.gsfc.nasa.gov}{http://mirador.gsfc. nasa.gov}]..."` and

`"..data from AIRS AQUA [\url{http://mirador.`

```
gsfc.nasa.gov}]..."
```

produce the same result after \pdflatex, namely,

"...data from AIRS AQUA [`http://mirador.gsfc.`
`nasa.gov`]..."

However, if `<target_address>` is too long and the compiler can not break a string or breaks it incorrectly, the command \href{}{} becomes more preferable. In this case, the first parameter in the command (URL address or DOI index) is constant, which ensures the correct construction of hyperlinks, whereas the second parameter (`<anchor_text>`) may be forcibly torn inclusion of extra space at the desired point, as it is the second parameter which is displayed in the translated text, for example, as shown here: "... according to the AIRS data of AQUA satellite [http://mirador. gsfc.nasa.gov]...".

Hyperlinks to DOI Indices

While forming the hyperlinks to the DOI indices hyperlink in the text consists of two parts: the DOI resolver address (`http://dx.doi.org/`) and DOI index, i.e. to form hyperlink to this article one should write `http://dx.doi.org/10.2205/2015BS016`

Reference List

In-text Reference Links

In-text references to the items of Reference list, for example, fragment

```
".. as is shown in [Brown, 1967] effect ..."
```

must be converted into the LaTeX form
```
".. as is shown in [{\it Brown}\reflink{
brow67}{1967}] effect ...",
```

and after translation to the PDF version looks as

"... As shown in [*Brown,* 1967] effect ...".

For other form of reference the fragment
```
"Sweet [1958] showed that ...
```

must be converted to the form

```
{\it Sweet} [\reflink{swee58}{1958}] showed
```

```
that...
```

and after the translation to PDF version it looks like

"$Sweet$ [1958] showed that ..."

The command `\reflink{<citation_key>}{<year>}` includes two parameters: `<citation_key>` and `<year>`. The first parameter, which is used as an anchor in "anchor-target" pair for the current hyperlink can be any text string, but must be unique in this article, the second parameter is the year of publication.

Format and Structure of the Reference List

For historical reasons the journals published by GC RAS have format and structure of reference lists similar to that developed for AGU journals (See, for example, AGU Reference Style).

The format and structure of the reference list substantially modified in order to simplify their conversion to the structures defined in the CrossRef and eLIBRARY.RU XML schemas. In the reference list included links with the mandatory minimum parameters that allow processing and their inclusion in the bibliographic databases and search engines. Other links (private communications, work in the press, unpublished

material, etc.) can be informally described in the text.

Table 3 shows the format of the six major types of bibliography items supported by $\mathcal{ELXpaper}$ package. For each type defined mandatory parameters (marked with an asterisk) and the recommended settings (marked with a plus sign). At least one author must be included in the parameter \refauthf{}{}{}. If the names of the authors are not defined in the cited publication, it is possible to use the name of the editor(s) to fill in \refauthf with inclusion Ed[s] as a third (suffix) parameter. (See. *Samples of reference...* subsection in the LaTeX version of this article).

If there are two or more authors the second and subsequent ones should be included in the parameter \refauth. In case of more than nine authors it is recommended to include the first three names with the addition of a parameter \refgroup{}. By default, the expansion (**et al.**) will be added to the output version of the document. If the items of the reference list are presented in two languages, argument parameter \refgroup{} must be specified explicitly. The \endreference{} value may include information about the language of publication, update time of cited databases, etc. Inside the blocks describing items of the reference list, no punctuation characters are permitted,

Table 3. Required and Recommended Parameters of Reference Items

Parameter	Article in journal	Article in journal with DOI	Book	Article in book	Report/Map/ Theses/ Dissertation	Base/Set of data
	1	2	3	4	5	6
\reference {<target>}	*	*	*	*	*	*
\reftype {<reference type>}	*	*	*	*	*	*
\refauthf {<surname>}{<init.>} {<suff.>}	*	*	*	*	*	*
\refauth {<surname>}{<init.>} {<suff.>}						
\refgroup {et al.letc.}						
\refyear {<year>}	*	*	*	*	*	*
\reftitle {<article title>}	*	*		*	*	*
\refbook {<book title>}			*	*		
\refedit {<editor[s]>}			+	+		+
\refjour {<journal title>}	*	*				
\refthesis {<thesis title>}					+	
\refvol {<volume>}	+	+				
\refnumb {<issue>}	+	+				
\refpages {<pages>}	+	+	+	+		
\refpubl {<publisher>}			*	*	*	*
\reflocat {<location>}			*	*	*	*
\refaccess {<network address>}						*
\refdate {<time interval>}						+
\nbdoi |\brdoi |\tagdoi {<DOI>}		*	+	+	+	+
\endreference {<ancil. info>}	*	*	*	*	*	*

all necessary punctuation is added by the software during translation.

External Links From Reference List to Publications With DOI

- \nbdoi{<DOI_index>} – for indices with no math symbols like (<, >), and characters having special meaning in the TₑX system. The reference [*Nechitailenko*, 2011] shows this case. The string in the marked up text looks like doi:\nbdoi{10.2205/2011NZ000101}.

- \brdoi{<DOI_first_fragment>} {<DOI_second_fragment>} – for indices with no math symbols and special characters, if they are too long and translator can't break them correctly. The reference [*Plyusnina et al.*, 2000] shows this case. The string in marked up text looks like doi:\brdoi{10.1016/S0883-2927(99)} {00092-X}.

- \tagdoi{<first_fragment>}{<second_ fragment>{<third_fragment>} – for indices with math and special symbols. In this case unchanged DOI index of the cited document is used as the

<first_fragment> of the command, while the text used as the anchor is put to the <second_fragment> and to the <third_fragment> if necessary to break anchor string. Symbols < and > in <anchor_text> should be replaced with \textless and \textgreater correspondingly. The reference [*Hildebrand et al.,* 1991] shows this case. The string in the marked up text looks like \tagdoi{10.1130/0091-7613(1991)019<0867:CCAPCT>2.3.CO;2}{10.}{1130/0091-7613(1991)019\textless 0867:CCAPCT \textgreater 2.3.CO;2}.

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