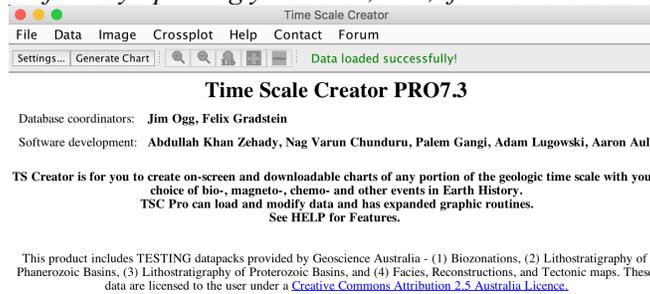


15 Feb 2018

Dear TSCreator Pro supporter:

We have mounted your **TSCreator Pro 7.3** for you in the password-protected site:  
( <https://engineering.purdue.edu/Stratigraphy/tcreator/tscpro/login.php> )

There are both a **.jar** (for Mac/Linus) and an **.exe** (for Windows) versions. [NOTE: If you have a problem opening the .exe; then first try updating your Java; and, if that doesn't work, then contact us.]



Licensed to Tester Tim  
website:  
username and password can be found in Help->Website.



Copyright © 2005-2018 Geologic TimeScale Foundation. For license information see "Software License" in the About menu.

TSC 7.3 internal dataset includes ca. 460 columns (40 are curves) grouped into 190 directory/subdirectory clusters; with a total of 52,000 data entries. The full listing of the main columns (a PDF table) is posted on the TSCreator website.

All data are standardized to the age models in GTS2012 with the updates in GTS 2016 ( "A Concise Geologic Time Scale 2016" (Ogg, Ogg, Gradstein; Elsevier Publ., ca. 240pp; published June 2016) that had included new ratified GSSPs, verified cycle-scaling, consensus biozonations/datums, isotope curves, and selected other developments since the publication of GTS2012.

There is currently an international group of over 50 specialists working on a multi-volume GTS2020, which will include enhanced inter-calibrations and a fine-tuned age model for most periods and within stages.

This letter briefly describes some of the main features:

- (I) TSC 7.3 new/revised data columns (e.g., Microfossils, Mesozoic sequences).
- (II) TSC 7.3 software program enhancements
- (III) New datapacks (Planktonic Foraminifers, Offshore Norway, etc.)

## (I) TSC 7.3 new/revised data columns (e.g., Microfossils, Mesozoic sequences).

A few of the numerous major enhancements and new columns are:

### (1) Nannofossils, Planktonic Foraminifers and Dinocysts

An international team has compiled a detailed taxonomy of all nannofossils and planktonic foraminifers at *Mikrotax.org* that is hosted by Univ. College of London. The TSC 7.3 has incorporated direct URL links (in the pop-ups) of all Calcareous Nannofossil and Planktonic Foraminifer datums to their website, which is maintained by Jeremy Young under the guidance of the Mikrotax group (Paul Bown, Brian Huber, and many others). The Nannotax3 set is now part of the Mikrotax website. This process also required some revision of previous genera and species nomenclature and of some events-within-zone calibrations, and those changes with former general-species names are documented in the popups. The Search function in TSC Pro will always enable you to search for former names when these are in those internal popups.

The foraminifers includes the recent revisions and images by Gradstein et al. (2017; "Planktonic foraminifera of the Jurassic", *Swiss Journal of Paleontology*)

There has been a similar revision of URL links for the Dinocysts datums to the new Dinoflaj3 website (*dinoflaj.smu.ca/dinoflaj3*), maintained by Graham Williams, Rob Fensome and Andrew MacRae (Halifax, Canada). Please notify us of any revisions or enhancements that should be made to these or other microfossil columns.

### (2) Mesozoic Sea-level Sequences and revised abbreviation system

Since the publication of the Phanerozoic sequence scale by Hardenbol et al. (SEPM, 1998), there have been a succession of revisions and improved calibrations (e.g., Bilal Haq and Stephen Schutter, *Science*, 2008; John Snedden and Chengjie Liu, *AAPG Bull*, 2011; Haq, *Global Planet. Change*, 2014; and recently Bilal Haq, Jurassic sea-level variations: A reappraisal. *GSA Today* (Jan, 2018), **28**/1, doi: 10.1130/GSATG359A.1). The TSC versions have tried to incorporate all of these published updates, even though the detailed source information for the calibrations and magnitudes of eustatic sea-level oscillations have never been formally released. This TSC 7.3 incorporates the revisions by Bilal Haq for late Triassic-Jurassic-early Cretaceous interval (published 2018; including a suite of communications from Bilal Haq on calibrations). The scales indicate the magnitudes of sequence sea-level changes, plus schematic coastal onlaps -- as published (we realize that many are speculative "best guesses" by those authors). The absolute offset from present also required revision in order to properly fit the different publications into a coherent scale.

For the Jurassic, we also retained the separate Tethyan and Boreal sets by Hardenbol et al. (1998) under "Period-level Sequences" for those who wish to compare to Haq's 2018 revisions. The abbreviations for sequences have been modified following the scheme of Haq (2014, 2018) in which the Period has also been added (e.g., QGe1 is the first sequence in the Gelasian Stage of the Quaternary; and PrCap2 is the second sequence in the Capitanian Stage of the Permian). We thank Bilal Haq for advice, discussions and corrections on these revised interpreted eustatic sea-level scales. His present project is a re-examination of the 1998 calibrations for Cenozoic.

\*\*\*\*\*

## (II) TSC 7.3 software program enhancements

There are updated "Workshop" tutorials available on the website, both for basics and for some of the more advanced features of using TSCreator and making datapacks.

### Help Material

[What's New in version 6.3](#) (pdf, 2.1 Mb; March 2014)  
[What's New in version 6.8 and 7.0](#) (pdf, 2.7 Mb; July 2016)

[Basic TimeScale Creator Workshop](#) (zip, 15.7 Mb; August 2017)

This package provides several exercises to teach different features of TSCreator, use of datapacks and how to make datapacks with lithology columns and image insertions, pop-up menus etc. The package includes: PDF file of instructions, prepared Excel file templates for the exercises, Image files.

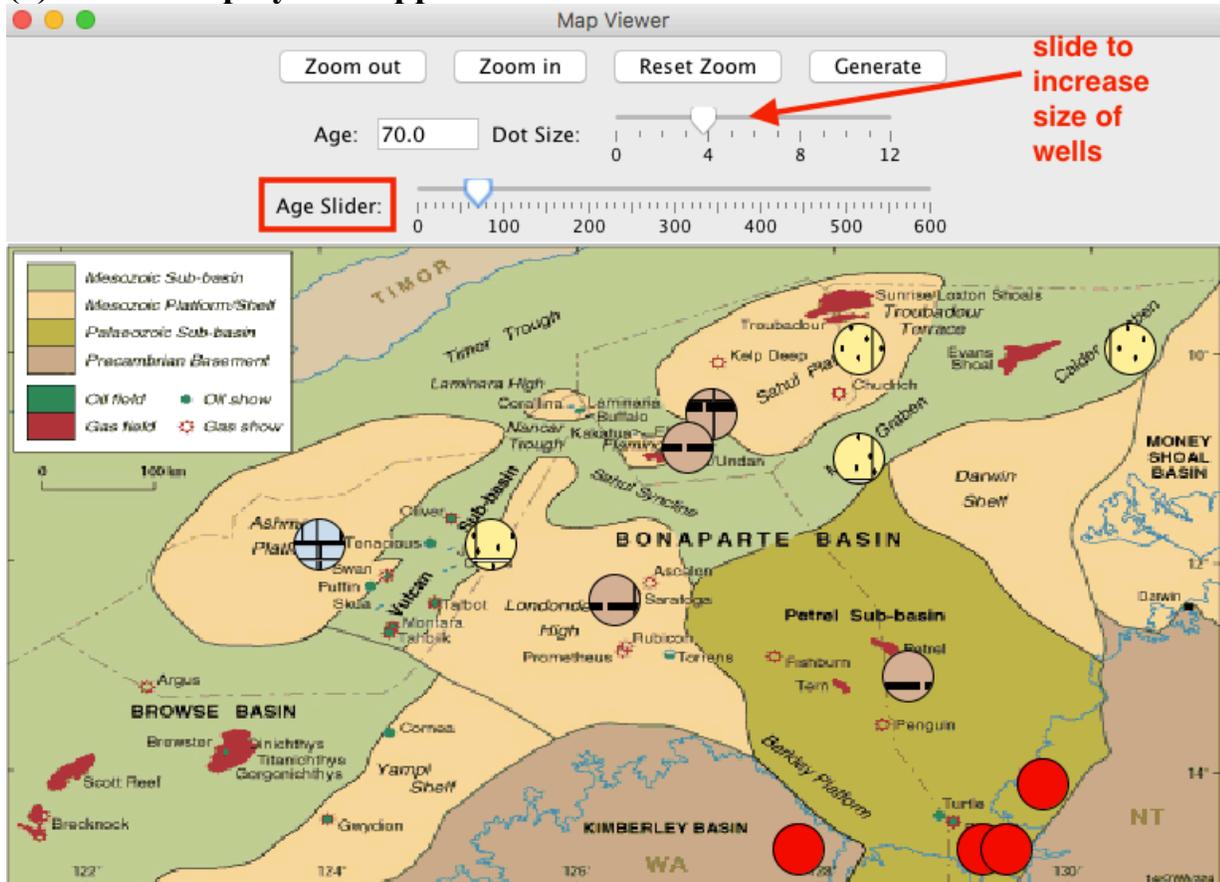
[Advanced TSCreator 7.2 Workshop](#) (zip, 59 Mb; September 2017) Use with **TSCreator version 7.2!!!**

This package includes the basic TimeScale Creator Workshop. In addition you learn how to make your own map packs and how to use the crossplot feature. The package includes: PDF file of instructions, prepared Excel file templates for the exercises, Image files.

We will be posting an enlarged (ca. 200 pages) complete user-manual that incorporates the "What's New" sets in the coming months.

- (1) **JAVA 8** – We had to revise some portions of the TSCreator code and libraries to be consistent and work with the newly released Java 8. However, it seems that programs compiled with this Java 8 are not always backward compatible with older Java versions (indeed, Purdue's grading system temporarily had problems). Therefore, if you have problems with TSCreator 7.3, we recommend that you first update your Java before contacting us.

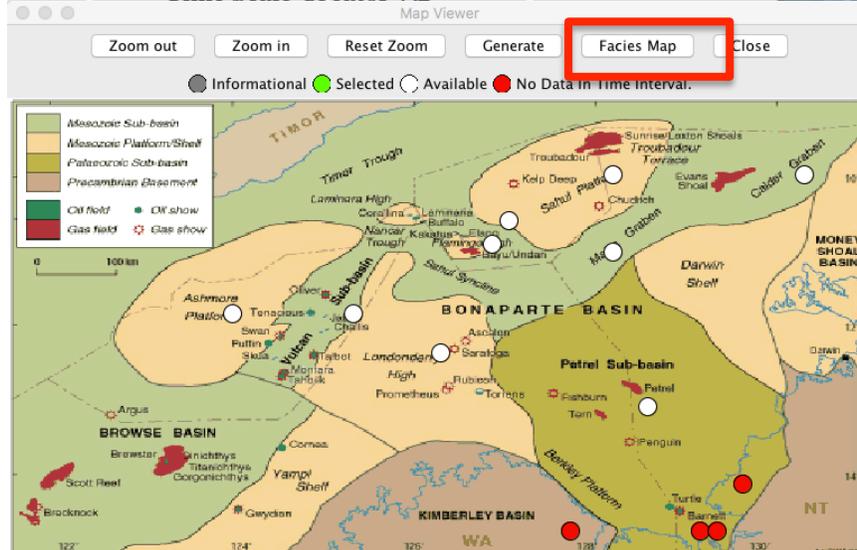
## (2) Facies display in Mappacks



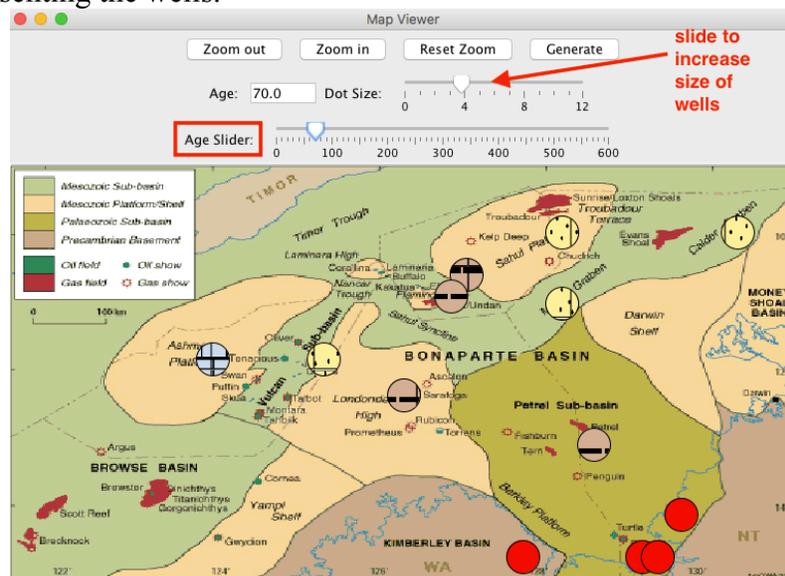
When you have a suite of facies columns in a region with a map-view display, then you can get an immediate glance at the schematic lithology in that region. This includes two "sliders", one for selecting the age (which can also be typed directly into the box), and another for adjusting the size of the "dots" where the lithology columns are located. This function works for any of the TSCreator regional mappacks or any mappack that you construct.

Example of how to use (we assume you know the basics of TSCreator for this compact one): At the TSCreator <https://engineering.purdue.edu/Stratigraphy/tscreator/index/index.php> website, under Datapacks menu, **download "Australia Mappack"**. This joint product with Geoscience Australia contains lithologic columns for all major Australian basins for the past 2.5 billion years, plus all major biostratigraphy zonations and sets of tectonic reconstructions (a total of nearly 500 columns!). We will use only a small portion. Add this datapack to your TSCreator. It takes about 10 seconds, due to the 500 columns.

Under Settings, click “**Map Points**” (upper-right button on TOP menu), which will open a set of maps. Click the Australia base map (top one). Bonaparte Basin is at the top, with a submap at the leftmost square. Click it to open that sub-map, then click “**Facies Map**”:



A new window will open with a time slider. As you move the slider through time you will see the lithologies changing in the well dots. With the “Dot” slider you can adjust the size of the circles representing the wells.



Play a little with the slider. This will work on all submaps. It also works on Transect sets that have incorporated reference wells (e.g., the New Zealand datapack).

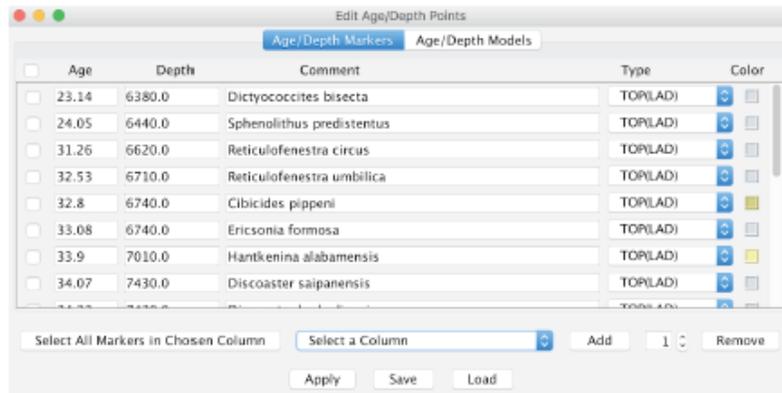
### (3) Enhancements to Cross-plot and Depth-Age conversion

#### (a) Color coding of auto-correlated biostratigraphic datums – now functioning

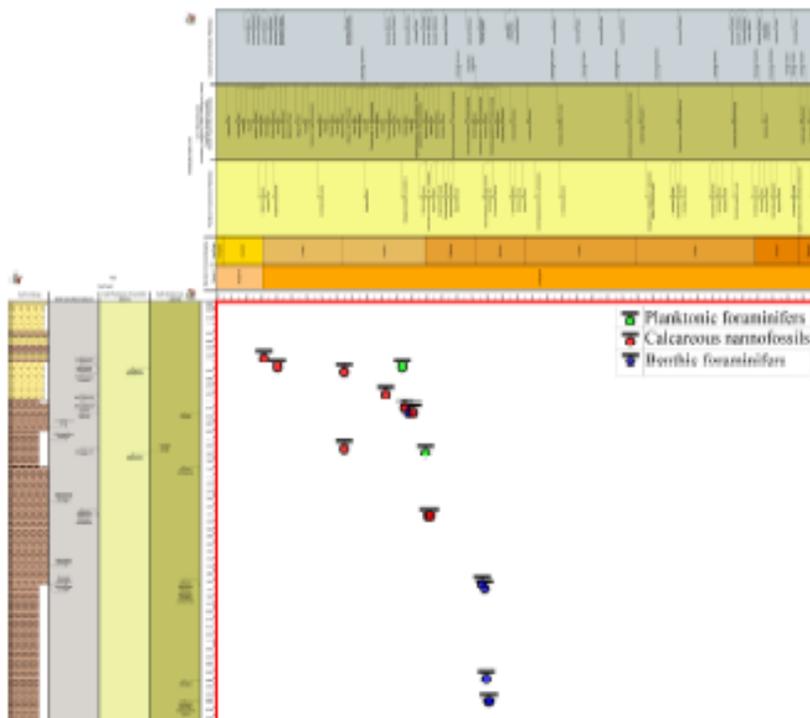
The “Automatch” function in the Crossplot system compares the reference time scale datums (and also zones) to the assigned FAD/LAD (and zones) in a borehole or outcrop. If the names of datums or zones match, then these are automatically displayed on the crossplot display. The default colors in cross-plot for auto-matching events/zones is the background color for their TSCreator column

(e.g., “nannofossils” were usually against light gray background columns). Fine for that type of graphics, but very dull for cross-plot of the different taxa and changing each one's color was laborious.

Those datum-match points in the crossplot window could be edited by choosing the "Edit Age/Depth points" option in the cross-plot upper tab menu. The "Comment" field is automatically the name of the fossil or zone that had been matched; and you can edit the age/depth, comment or type of symbol display on the crossplot display. You can also assign a color to an individual datum. We have now corrected many problems with the "Select all Markers in a chosen column" with "Select a Column" pull-down menu (e.g., it would display "Calcareous Nannofossils" or whatever name was used on the reference time scale for that column) to the Lower Left tab of that Edit Age/Depth Points menu:



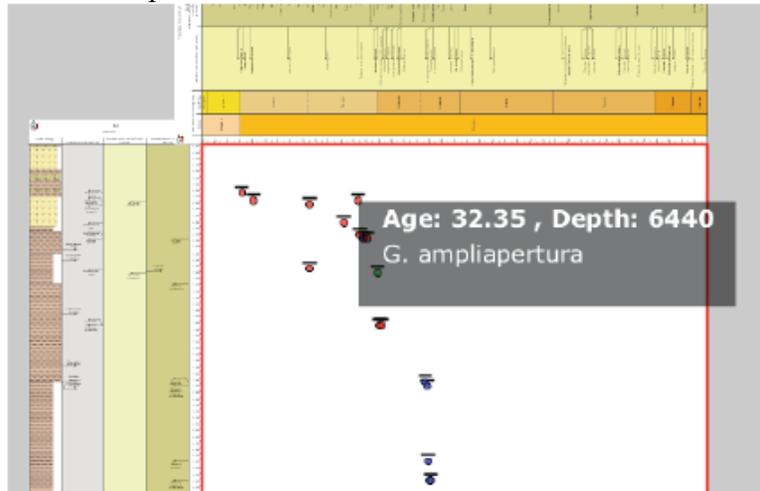
With the "Select all Markers", you can now change the color for ALL fossils of that type at one time. If you want to make color changes to a whole group of markers, then go to *Select a Column*, choose your column and click *Select All Markers in Chosen Column*. All chosen markers will show a check mark. You can then change the color on just one of them and the change is applied to all of them.



NOTE: Upon making any changes, one must click "Apply" (bottom of menu), then move the mouse-pointer into the Crossplot display to see those changes. [You can also select a point and then

remove it; however, make sure that you "applied" all your other changes before removing a point, otherwise your changes will not be accepted.]

Press "P" to open the pop-up function for the marker points which will display the age/depth and comment for that correlated point:



Popup associated with a point

#### (b) **OUTCROPS (stratigraphic "up")**

Until now, the crossplot system (and rest of TSCreator) only supported borehole-type data (depth measured down). We have worked on making the Crossplot system accept both borehole (measured "down") and outcrop (measured "up"). For outcrop datapacks, beginning with TSCreator 7.0, there is the option of flag at the beginning to tell TSCreator to handle that information differently.

date: [TAB] 16/12/2009  
**outcrop:** [TAB] **ON**  
**age units:** [TAB] **Upmeters** (or any name you wish to give to the units, other than "Ma")  
 Chart title: [TAB] This is my outcrop near Purdue

The "What's New in TSCreator 7.0" on the website gives details.

We have removed many bugs in the Crossplot and Depth-to-Age conversion system when using Outcrops. As with the previous borehole depth-to-age conversion system, the outcrop depth-to-age version now also inserts a semi-intelligent column of "pre-conversion" meter levels onto the age-converted column to allow one to see how the original field scale has been converted to time. When doing a Depth-to-Age conversion for outcrops ("up"), the system also automatically attaches an Accumulation Rate curve based on the sets of Depth-Age constraints. You can access this calculated data at the top of the saved file. If the cross-plot system (or your own inputted depth-age control points) indicates that a level in the outcrop has a hiatus, then the graphic-pattern for a hiatus is properly displayed in the resulting "age-converted" lithology column for that outcrop.

#### (4) **Datapack making – additional parameters**

(a) *Lithology column width* – The "width" value in the column header is now active. The default is a simultaneous application of that width to both the Lithology-Pattern columns and to the Formation-name column. The width-value does not affect the Member-name column (which is default off) or the Group-name column, so you will currently need to change those separately if their default-widths of 100 are inadequate.

*My borehole facies* **150** 221/221/221.

We recommend either 100 or 150 for most graphics of lithology columns.

**(b) Options to install default Depth-interval and scaling**

[this now works for Boreholes in meters, Outcrops "up", human scales in Ka, etc.]

In the initial headers of datapacks, one can specify time-interval and vertical-scaling defaults.

For example, to pre-set a zoom-in for part of the Oligocene, then:

SetTop: [TAB] 25 -- where "25" is 25 Ma

SetBase: [TAB] 32

SetScale: [TAB] 5 -- where "5" is 5 cm/myr vertical scaling

We have now fixed and enhanced this system, so one can specify a default-display interval and scale for a borehole or outcrop datapack.

**age units: [TAB] meters (or any name you wish to give to the units, other than "Ma")**

SetTop: [TAB] 2400 -- where "2400" is meters

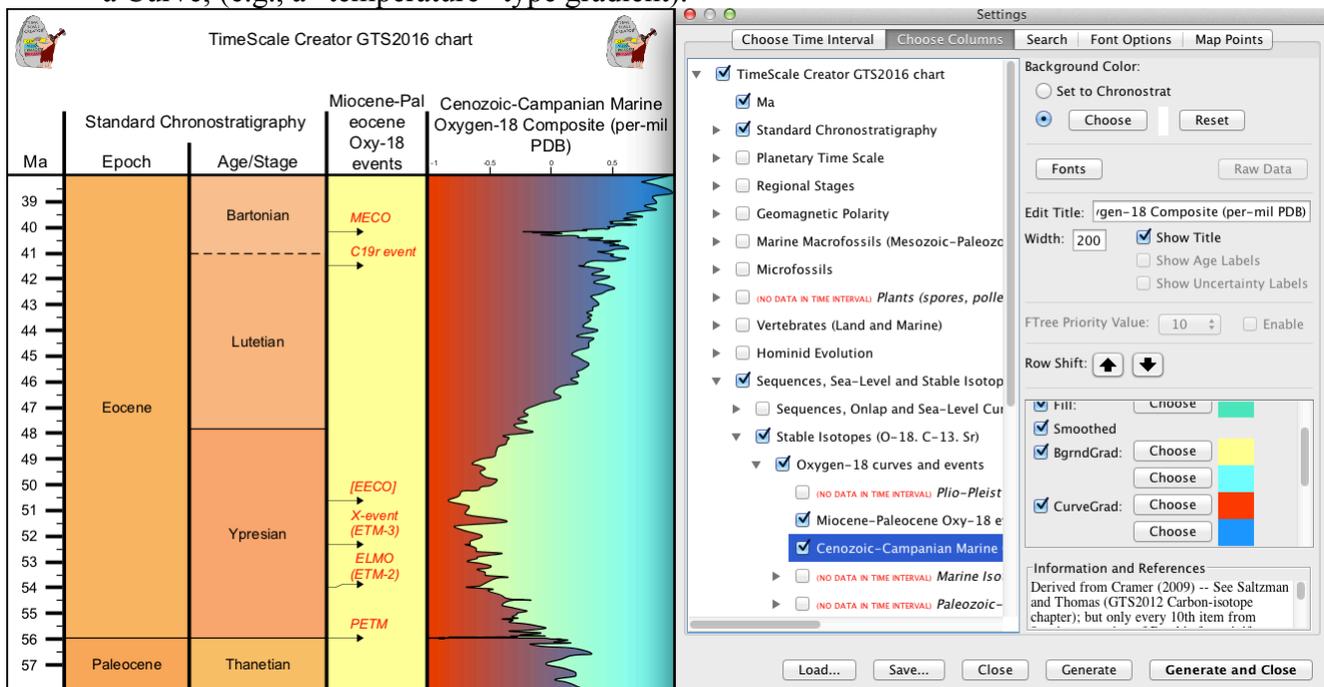
SetBase: [TAB] 3200

SetScale: [TAB] 0.01 -- where "0.01" implies 1cm per 100m vertical scaling

\*\*\*\*\*

**Some past enhancements (reminders of some useful features in TSC 7.0):**

**(1) GRADIENT-FILL (Point curves) – The TSC supports Gradient-fill of a Background or the Fill of a Curve; (e.g., a "temperature" type gradient).**



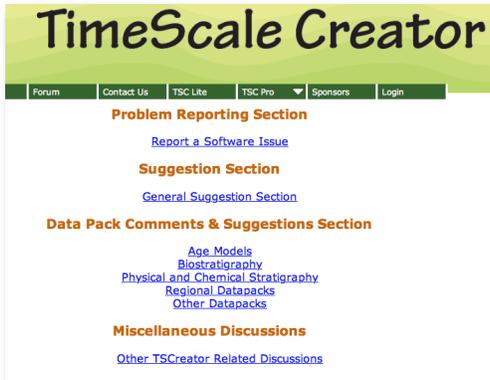
To use a gradient fill, go in the menu to find the curve-column; then highlight it to bring up the menu of options. In the middle part of that menu suite, scroll down below the "show scale" to get to "Gradient". You can select the end-members for a two-tone fill to the Background, and to the Curve-fill. For Curve-fill, the "Fill" must be checked above the Gradient set. [NOTE: Set-Scale and other options are below the Gradient-selection set.]

**(2) Contact Us – direct link between Popups and TSCreator website “forum”**

At the bottom of each popup is automatically a Hot-URL-link to a new Forum page at the TSCreator website:

For an example of lithological details, click [Report Geological map N](#)  
click [Colombian geological cartography](#) .

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To discuss about this datapack or report problems, please click [here](#).



You can also enter this Forum directly at the website. The comments go directly to us, and then we “authorize” these to be displayed.

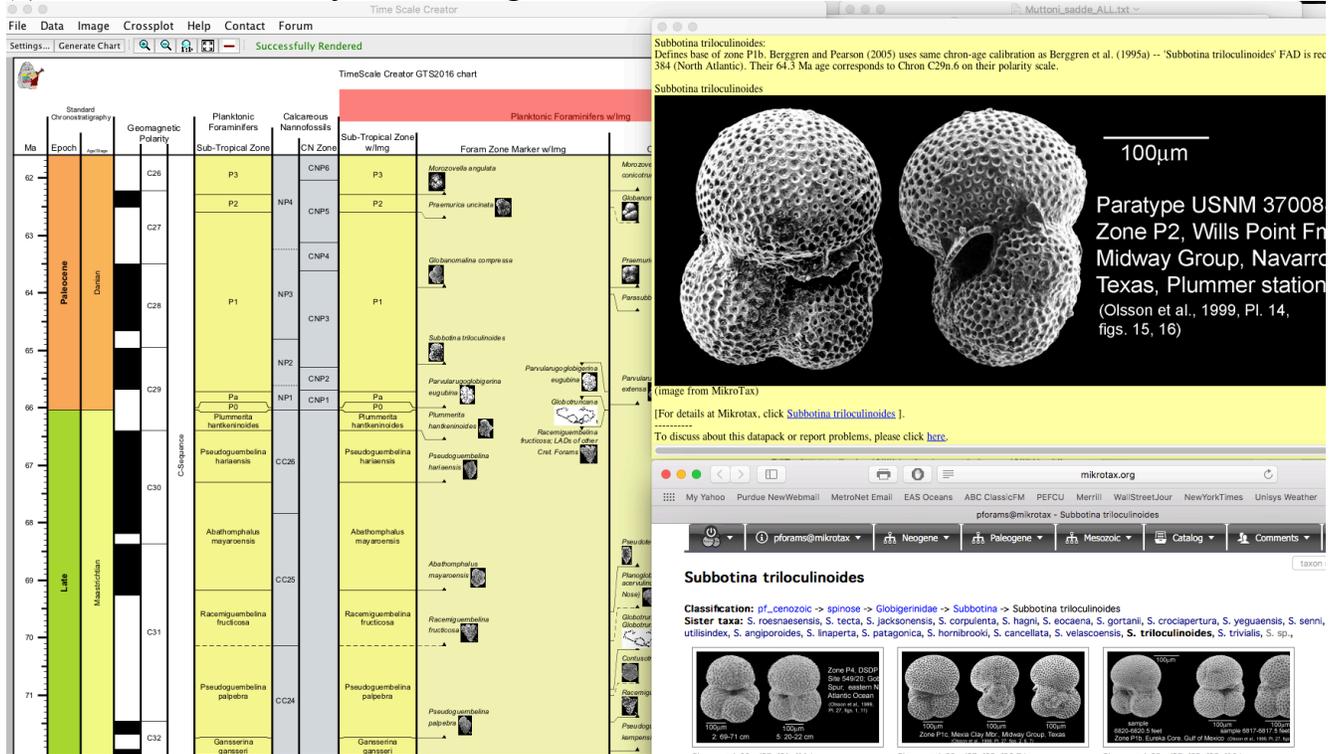
We will strive to provide feedback, and you can see earlier comments/discussions.

\*\*\*\*\*

### (III) New datapacks (Planktonic Foraminifers, Offshore Norway, etc.)

You can download these new or greatly enhanced datapacks from the TSCreator website.

#### (1) Planktonic Foraminifers with images



Datapack *PlanktonicForams\_Jur-Modern\_wImages\_Aug2017.dpk* (encoded zip file, 54Mb, 5 columns with ca. 350 datums and 470 images). In collaboration with Mikrotax (<http://mikrotax.org>); compiled by Jeremy R. Young and Bridget Wade (Univ. College of London), Brian Huber (Smithsonian) and many others. It has nearly all of the Jurassic through Present microfossil datums in the regular TSCreator internal datapack, but are enhanced in this "add datapack" with thumbnail images for event columns and full-size images in pop-ups with links to Mikrotax. We thank Jeremy Young, Brian Huber and the Mikrotax team for permission to use the example images.

#### (2) Calcareous Nannofossils with images

Datapack *Nannos\_wImages\_Aug2017.dpk* (encoded zip file, 56Mb, 16 columns with ca. 350 datums and 920 images). This is similar to the new Planktonic Foraminifer datapack, and has all of the Triassic through Present calcareous nannofossil datums that are in the regular TSCreator internal datapack. In addition to the on-screen thumbnail images, the popups have larger images (both SEM and Visual), with URL links to its webpage at Nannotax3 website under Mikrotax.org with extensive details, additional images and taxonomy. We thank Paul Bown, Jeremy Young and the Nannotax team for permission to use the example images.

#### (3) Ice Cores and Human Culture – in Ka

Datapack *HumanCulture\_19Jan2016.txt* (text file, 0.5 Mb) has global "human culture" intervals (ca. 200 columns), plus climate signal from Greenland ice cores (From Seierstad et al. (2014 *QuatSciRev*); NGRIP1 until 9820 b2k, NGRIP2 below). Only a small portion of this "human

civilization" suite was used in *The Concise Geologic Time Scale 2016*. [NOTE: This datapack must be inserted using the "**Replace Data with Datapack**" command; the scale in **ka** is not compatible with the internal dataset in Ma. A vertical scale of 5 kyr/cm is recommended to see details.] [*Provided courtesy of Grace Conyers and Colleen Klockow, Purdue University; with updates and enhancements for Concise Geologic TimeScale 2016*]. We are looking for volunteers to enhance the regional sets.

#### (4) *Lexicon for Offshore Norway*

We had released in 2016 the main TSCreator datapack that was compiled in conjunction with the former NORLEX program at Univ. Oslo (coordinated by Felix Gradstein). This datapack included an extensive Biostratigraphy (zones, ranges, datums) and reference lithostratigraphy datapack with images of all major microfossil taxa. Therefore, the image-heavy datapack is approximately 250 Mb in size.

#### Gulf of Mexico

#### NORLEX Biostratigraphy (North Sea and Norwegian Sea)

NORLEX (North Sea and Norwegian Sea) Biostratigraphy with images. Main Mesozoic-Cenozoic suites include lithostratigraphy, dinoflagellate cysts, pollen and megaspores, and foraminifera.

Download database at [NORLEX biostrat GTS2016 23July2016.dpk](#) (this is a LARGE encrypted zippack, 270Mb, ca. 80 columns including ca. 1000 images – with large format images in popups).

Detailed Table of contents and references at [NORLEX contents GTS2016 23July2016.pdf](#)

Coordinated by Felix Gradstein, with images from several contributors (including palynology ones from Dirk Munsterman). Assembled and standardized by Rebecca Bobick (2014,2015); Ages standardized to GTS2016 age model (Ogg, Ogg, Gradstein, 2016; A Concise Geologic Time Scale 2016; Elsevier).

The entire NORLEX website has now been migrated and greatly revised (by Gabi Ogg) to the website of the Geologic TimeScale Foundation (which supports TSCreator development). It is now located under "Resources"/"Lexicons" as "**Lithostratigraphic Units of North-West Europe**":

Secure | <https://engineering.purdue.edu/Stratigraphy/resources/lexicons.html>

Apps TS-Creator Maker TS-Creator Home GTSFoundation Hotmail Huntington PEFCU Metronet Weather Google Maps

**Geologic TimeScale Foundation**

Home GSSPs Charts & Books Stratigraphic Guide Resources TS Creator Board Mem

Regional Correlations  
Formations  
Definitions  
GeoWhen Database  
Links to Earth  
History

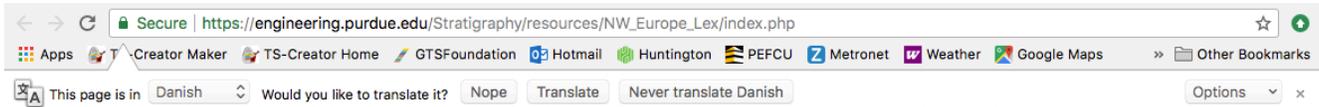
## Stratigraphic Lexicons

On-Line regional stratigraphic units (formation "Lexicon") sites

The definitions of regional formations (name, type location, characteristic lithology, age constraints) have been compiled for different regions. These "stratigraphic unit databases" or "stratigraphic lexicons" are generally searchable.

#### Lithostratigraphic Units of North-West Europe -- formerly "NORLEX"

[Click here to enter the site](#)



## Lithostratigraphy

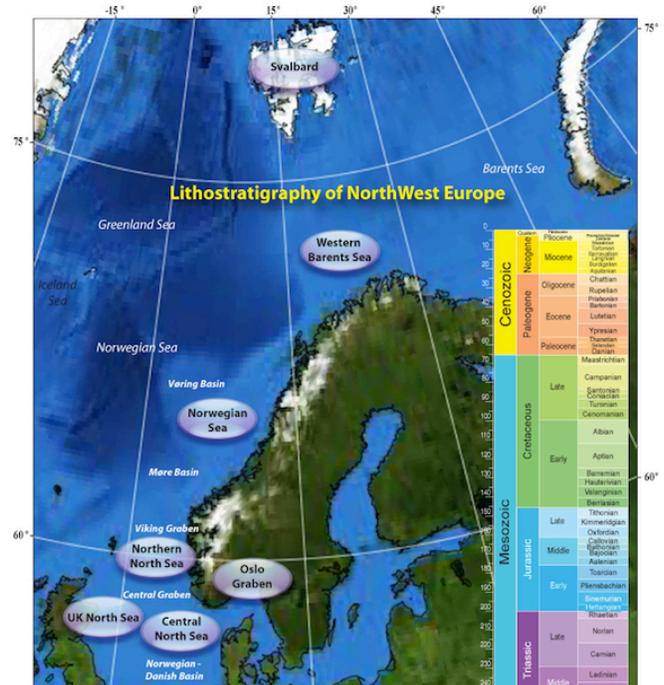
- [Lithostratigraphic chart Barents Sea with Svalbard, Bjørnøya and Franz-Josef Land](#)
- [Lithostratigraphic wall charts, offshore Norway](#)
- [Neogene, North Sea](#)
- [Paleogene, Rogaland Group, North Sea](#)
- [Cretaceous, Norwegian Sea](#)
- [Cretaceous, North Sea](#)
- [Cretaceous, North Sea UK Sector](#)
- [Jurassic, North Sea and Norwegian Sea](#)
- [Triassic, North Sea](#)

[A3 Time Scale chart and Tower of Time \(in Norwegian\)](#)

## Biostratigraphy

- [Cenozoic Biostratigraphy of the North Sea](#)
- [Cretaceous Biostratigraphy of the northern North Sea and Norwegian Sea](#)
- [Atlas of agglutinated foraminifers](#)

[Regional literature](#)



## (4) TSCreator Lite enhancements

The revised Planktonic Foraminifer, Calcareous Nannofossil, Dinoflagellates, and Phanerozoic Sequence sets are also installed on the TSCreator Lite system (at the TSCreator website <https://engineering.purdue.edu/Stratigraphy/tscreator/>). These, like the external datapacks, have all images for the nannofossils and microfossils, plus larger versions within the popups. You can even run these from your iPad or iPhone!

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## Current projects (a subset):

### (1) Datapack makers (browser-based)

We have functioning browser-based “*Transect Maker*” which also has options for outputting map-pack format for the transect reference wells and segments, “*Curve Maker*”, and “*Lithology Maker*”, and have tested these

The release of this “transect-maker” (as soon as we have a more stable and secure server system to support external browser access) will be accompanied by a convenient “*Curve Maker*”, and an “Evolutionary-Tree Maker”. These should enable a more streamlined error-free method of making your own datapacks and mappacks. Our goal is an integrated set of datapack makers using browser-based interfaces. This has been a 2-year project in conjunction

with a student team with the Computer-Engineering department at Purdue University, and is on-schedule for release in Summer 2018. The Transect and Curve maker portions have already been incorporated in workshops that we gave to the Belgium Stratigraphic Commission, Canadian Geologic Survey and other groups; and their feedbacks are being incorporated before release to all Pro users.

**(2) *On-line TSCreator service***

We had developed a prototype for a server-hosted TSCreator in collaboration with NORLEX. This browser-based system returns charts to a user, but with fewer options for graphical settings (e.g., fonts are fixed, etc.). However, the Beta version suffered problems with server memory. Therefore, one of our goals for 2018 is to enable one to construct datapacks via the browser interface and to automatically load your new datapack into the server-based TSCreator; hence bypassing the JAVA-based program version for these initial datapack making/testing steps. In addition, the server-based TSCreator can be migrated to in-house systems with pre-installed datapacks.

**As always, we appreciate any requests that you may have for software enhancements, user interfaces or reference datapacks.**

**Thank you,**

James Ogg (TSCreator coordinator; etc.)

Gabi Ogg (TSC website; etc.)

Aaron Ault (Purdue Computer Engineering)

Felix Gradstein (GTS Foundation Chair)

*With: Andy, Jason, Nag, Rebecca, David, Xinjie, Yunchao, Estefania, Marcos, Connor, Wendy, and many other Purdue computer-engineering and geoscience students that are in the TSCreator teams that you have supported in the past three years.*