

MISSISSIPPI GEOLOGICAL SOCIETY

eBULLETIN

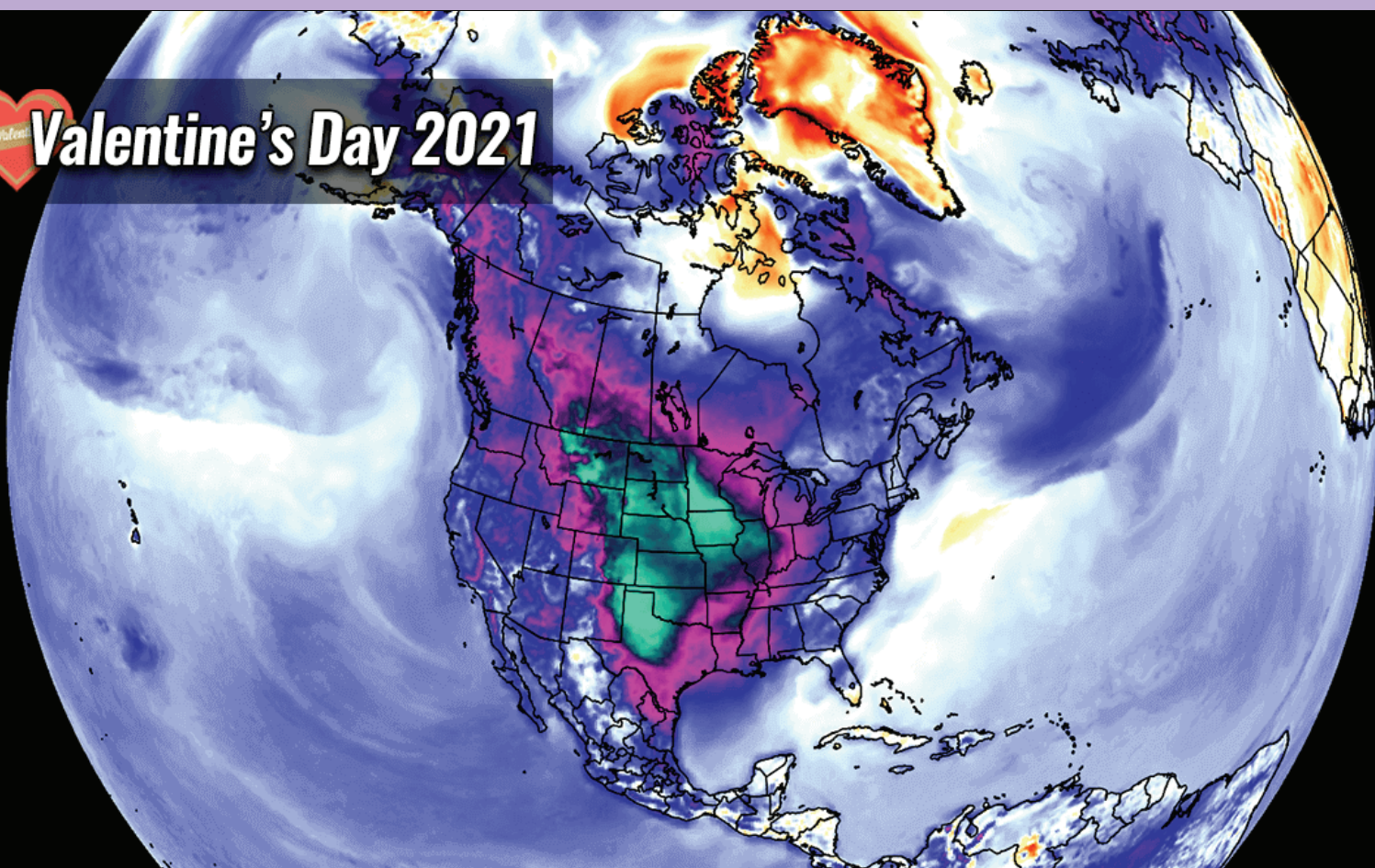
Volume 69

No. 7

March 2021



Valentine's Day 2021



FOSSIL FUELS

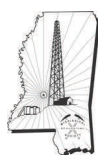
Lars Johnson

ENVIRONMENTAL GEOLOGY, COLD WEATHER, AND JACKSON WATER PRESSURE

Dr. David T. Dockery, RPG, Office of Geology

OIL PATCH QUIZ

Steve Walkinshaw, Vision Exploration



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PRESIDENT'S LETTER

David Snodgrass, MSOGB



MGS Members,

Looking for geology resources or groups with like-minded people. Whether you like Facebook or not, it is a great resource to find what you are looking for. Learning about your surroundings has never been so easy. There are literally hundreds of Facebook groups for geologists and fans of geology. In Mississippi, groups like Mississippi Fossils & Artifacts and Mississippi Rockhounds and Gem Hunters come to mind. Take a look and you might be surprised at what you can find or who you could meet in Mississippi. I also go to Science Daily at https://www.sciencedaily.com/news/earth_climate/geology/ to read the latest in geology. Give them both a try...you won't regret it.

Oil prices continue with its upward trend following reports that the OPEC+ group could be weighing the possibility not to increase collective oil production from April as widely expected. As of the date of this letter, oil is at \$60.64 and gas is at \$2.83

As previously mentioned, due to the ongoing Covid-19 pandemic the MGS will continue postponing our monthly luncheons at the River Hills Country Club. We expect, at least, we will have a speaker for May on subject of Storage Caverns in Salt Domes. The presentation will be available through Zoom. Please stay tuned for more details. For now, take care.

Sincerely,

David H. Snodgrass



BOLAND SCHOLARSHIP WATCH

Faculty & Students,

This Mississippi Geological Society along with the Boland Scholarship Fund would like to remind you that we want to honor the most outstanding overall students for the 2020-2021 year.

Each year, the Boland Scholarship awards 1 student from each institution a check that rewards students for their hard work and dedication to the Geosciences and their community.

We look forward to a great year and hope to see you at our monthly meetings.

Best Regards,

Matt Caton
Editor



THE UNIVERSITY OF
SOUTHERN
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GEOLOGY POST

FOSSIL FUELS

Lars Johnson

"The arctic weather hammering parts of the country should be a cold slap of reality. Eighty per cent of our energy comes from natural gas, oil and coal. We need all of our current energy sources." Steve Forbes

<https://www.forbes.com/sites/steveforbes/2021/02/19/can-the-world-economy-survive-without-fossil-fuels/?sh=210cca831b9c>

I am a petroleum Geologist. I am concerned about the public's lack of information about the importance of fossil fuels. As stated, 80 % of our energy comes from natural gas, oil and coal.

I recommend the Madison County Journal publish a series of articles (with graphics) detailing the information from this U. S. Energy Information Administration's website. The below link details, in the easily understood circular diagram format, the required sources of energy for electricity in our section of the US. Other sections of the U.S. can also be viewed to compare their generation mix with our area.

https://www.eia.gov/beta/electricity/gridmonitor/dashboard/daily_generation_mix/regional/REG-MIDW

This data, in easily understood circular diagram format, makes it abundantly clear our current reliance on fossil fuels for our electricity. Natural gas, coal, (& nuclear) are key energy source requirements for much of the U.S.. Graphics showing (comparing & contrasting) the country as a whole would be very informative, as shown at U.S. Daily Generation Mix. (Multiple pie charts across the US)

https://www.eia.gov/beta/electricity/gridmonitor/dashboard/daily_generation_mix/US48/US48



GEOLOGY POST

FOSSIL FUELS

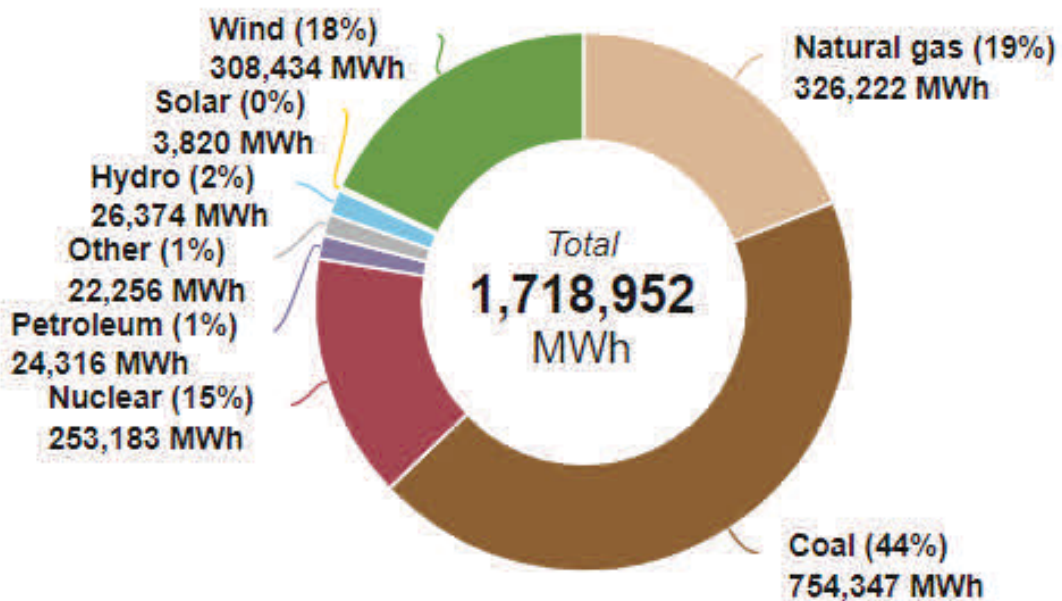
Lars Johnson

https://www.eia.gov/beta/electricity/gridmonitor/dashboard/daily_generation_mix/US48/US48

A "picture is worth a thousand words"...and these graphics clearly demonstrate the continuing importance of fossil fuels and nuclear energy as well. In certain parts of the country, solar and wind are also shown to be important sources for some of energy required for electricity generation. However, it is hard to overlook the continued important role and energy source provided by our fossil fuels...coal, gas, and oil...as well as nuclear power.

Midwest (MIDW) region daily generation mix 2/24/2021, Eastern Time

megawatthours





CURRENT PRICES

Crude Oil WTI (NYM \$/bbl) Front Month

[+ WATCHLIST](#)

OPEN

Last Updated: Mar 15, 2021 at 10:44 a.m. EDT - Delayed quote

\$ **64.48**

▼ -1.13 -1.72%

SETTLEMENT PRICE 03/12/2021

\$65.61



Natural Gas Continuous Contract

[+ WATCHLIST](#)

OPEN

Last Updated: Mar 15, 2021 at 10:45 a.m. EDT - Delayed quote

\$ **2.545**

▼ -0.091 -3.45%

SETTLEMENT PRICE 03/12/2021

\$2.636





MONTHLY POST

Dr. David T. Dockery III RPG

ENVIRONMENTAL GEOLOGY, COLD WEATHER, AND JACKSON WATER PRESSURE

David T. Dockery III, RPG

In preparation for a FOX40 News interview in 2010 concerning Jackson's broken water mains in cold weather, I expected to reinforce the City of Jackson's explanation that it was caused by the Yazoo Clay shifting. But, after consulting some engineer friends in the geotechnical field, I found that cold water (37 degrees F or below) from the reservoir caused the water mains to shrink, due to thermal contraction, and break. At this time, Heping Liu of Jackson State University's Micrometeorology Laboratory operated the reservoir weather station (Flux Station) shown in **Figure 1**.



Figure 1. Top, the Ross Barnett Reservoir Flux Station operated by the Micrometeorology Laboratory at Washington State University in collaboration with the Pearl River Valley Water Supply District; Bottom, location of the station within the reservoir.



MONTHLY POST

Dr. David T. Dockery III RPG

Liu provided me the air and water temperature from the station for January 1 to February 20, 2010 (**Figure 2**). The cold-water explanation was given in the interview and published in MDEQ's August 2010 newsletter under the title *Jackson's Water Crisis, January 2010*. That article was republished in the first edition of *Mississippi Environmental Geology* (MEG) prepared for a Millsaps Geology class on Environmental Geology (published in January of 2018). The second edition (2019) of MEG is available as a download on the MDEQ Office of Geology website.

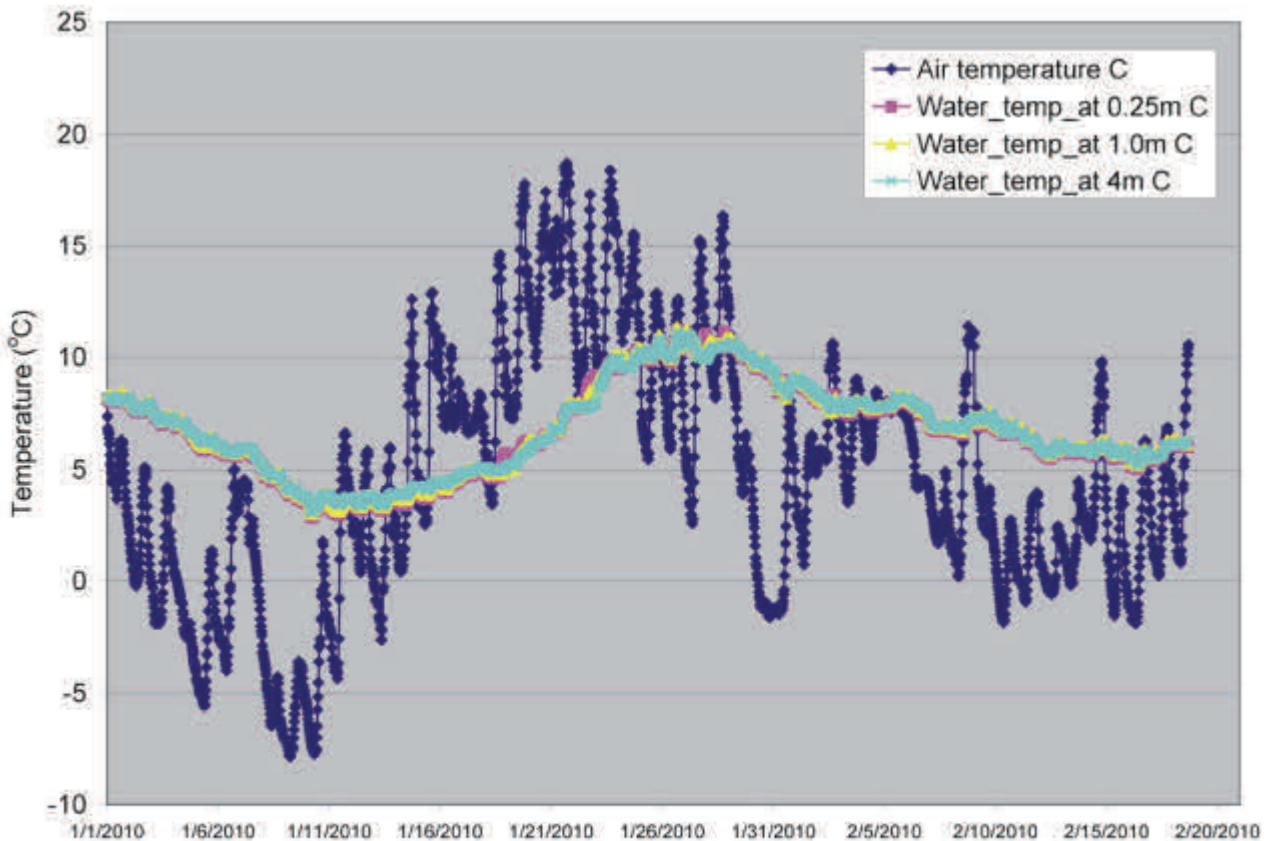


Figure 2. Air temperature in dark blue and water temperature in light blue (at 4 meters depth), yellow (at 1 meter depth) and purple (at 0.25 meter depth) in degrees centigrade (C). Record from the Ross Barnett Reservoir Flux Station from January 1 to February 20, 2010.



MONTHLY POST

Dr. David T. Dockery III RPG

One of the readers of the first addition of MEG was Millsaps Geology Professor Stan Galicki, who gave the cold-water/thermal-contraction explanation to Melanie Christopher of WJTV Channel 12 News for why Jackson pipes were breaking in the cold spell of 2018. Melanie interviewed me at my office in MDEQ’s 700 Building and interviewed the Director of Jackson Public Works (JPW) for a Special Report entitled “Broken Pipe Dreams.” The JPW Director was given a heads up by Melanie before the interview that the problem was cold water and shrinking pipes. So now that is what the City of Jackson is now saying when city pipes break in cold weather rather than blaming the Yazoo Clay, which is a year around problem and is affected by wet and dry spells, but not cold spells. At the time of the interview, the National Weather Service (NWS) Jackson operated the Ross Barnett Reservoir Flux Station. They were hard to reach, but I did get the low temperature for the reservoir water during the cold spell.

This year, with a split in the Polar Vortex, we knew the cold weather was coming. I asked MDEQ meteorologist Rodney Cuevas for help in contacting NWS Jackson for information on the Reservoir Flux Station. Rodney got me a different contact. It was none other than Professor Heping Liu now with Washington State University, Laboratory of Atmospheric Research. Due to COVID 19 and some problems with the station (fishermen had attached Christmas trees to the platform and ruined some of the instruments) no recent data was available from the station. Dr. Liu got the station back online with current station data and a seven-day graph of the station data.

The following is Dr. Liu’s explanation given on 2-12-2021 for the site being offline: “Due to the pandemic, we have had a limited maintenance of the site. Some of the sensors are not working well. Regarding the water temperature data, it looks that one sensor is still working (We used to have multiple temperature sensors in water). You can check the water temperature at about 0.1 meter below the water surface from this link: (<http://micromet.paccar.wsu.edu/water/plot/>).” **Figure 3** was the first data I received after Liu got the station back online on February 12 just in time to capture the cold spell data.

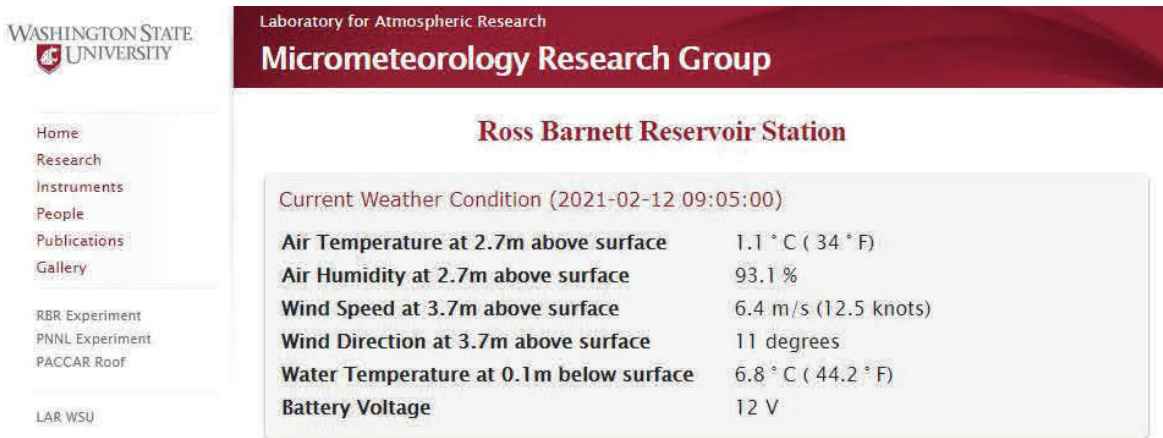


Figure 3



MONTHLY POST

Dr. David T. Dockery III RPG

After this we had sleet at noon on Valentine's Day, Sunday February 14 (**Figure 4**). My office desk diary is blank for the week of February 14-10 as State Offices in were closed in the Jackson area.

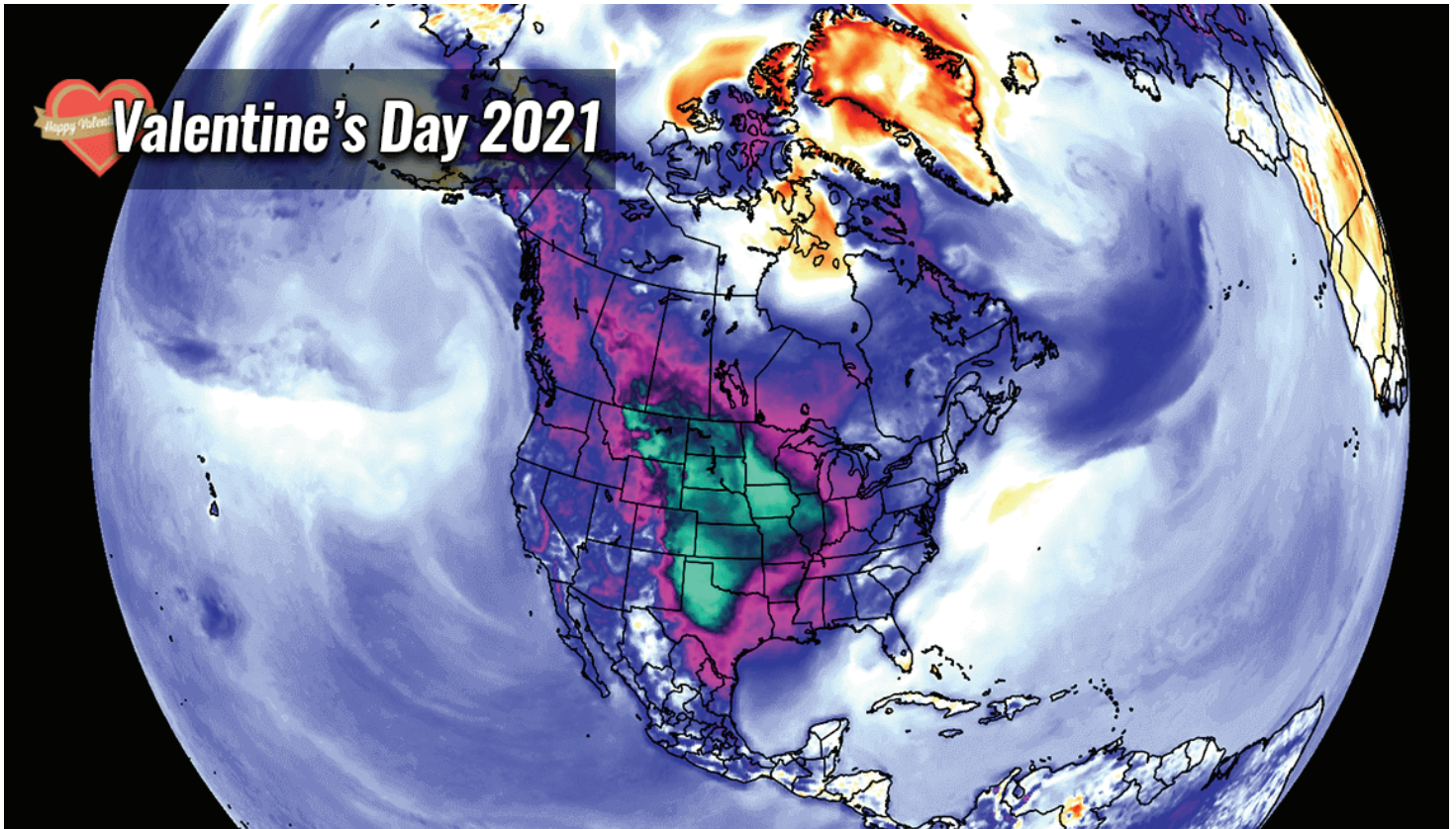


Figure 4. Arctic blast with deep freeze continues south and is expected to peak around Valentine's day, due to break-off lobe of the Polar Vortex (Marko Korosec, 10/02/2021)



MONTHLY POST

Dr. David T. Dockery III RPG

Figure 5 shows the Reservoir Flux Station's seven-day graph with multiple sensors for the date of 2021-02-17 08:15:00 am. At top is the graph is solar radiation, which has a five-day cloudy period between bookends of sunny days. At bottom this is the battery voltage with matching bookends of sunny recharging days. In the middle are graphs of wind speed, wind direction, relative humidity, air temperature at various levels, surface water temperature, and another water temperature (which seems to have malfunctioned around the coldest temperatures).

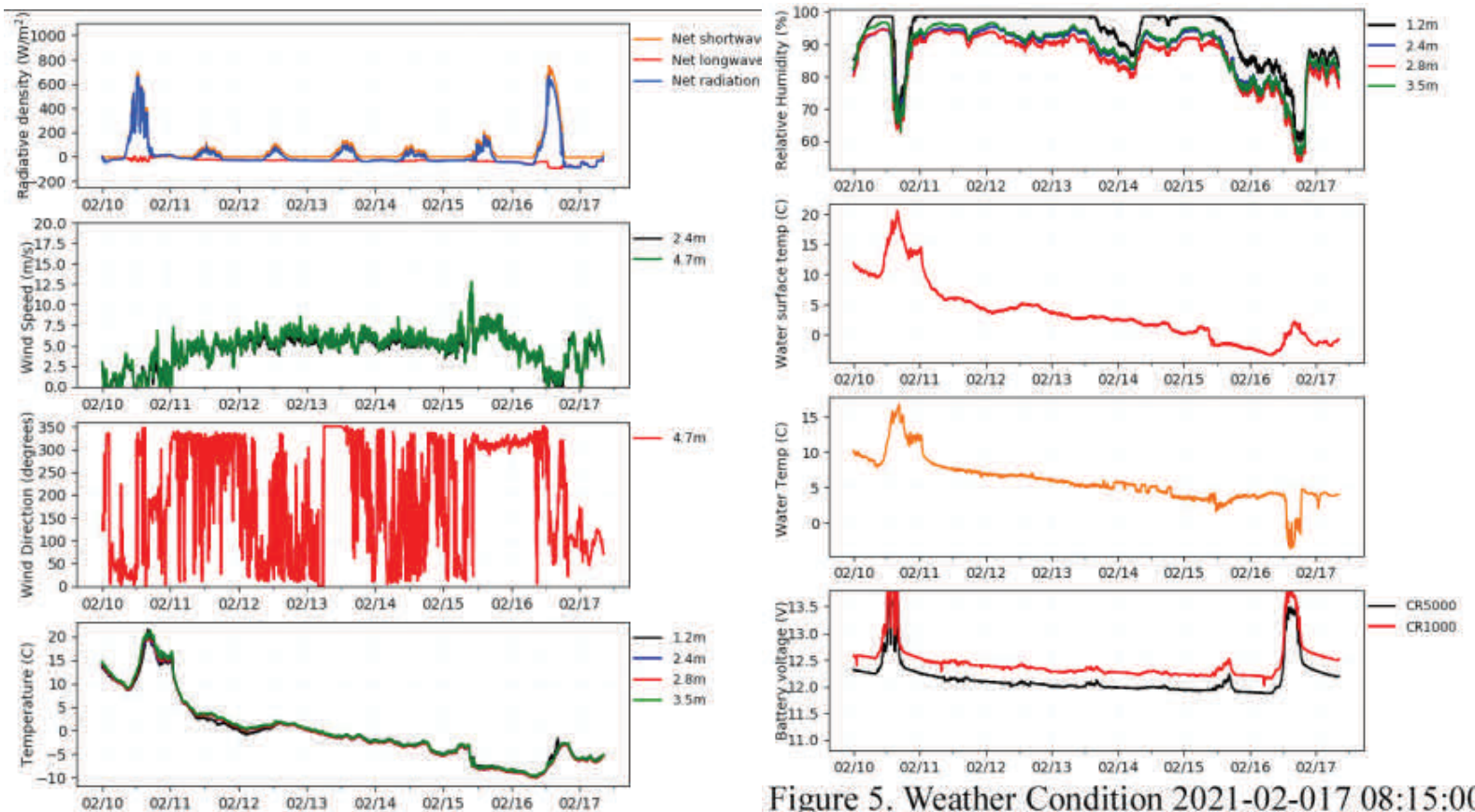


Figure 5. Weather Condition 2021-02-017 08:15:00



MONTHLY POST

Dr. David T. Dockery III RPG

Figure 6 shows how closely the air and water temperatures track each other in a seven-day chart ending on February 20.

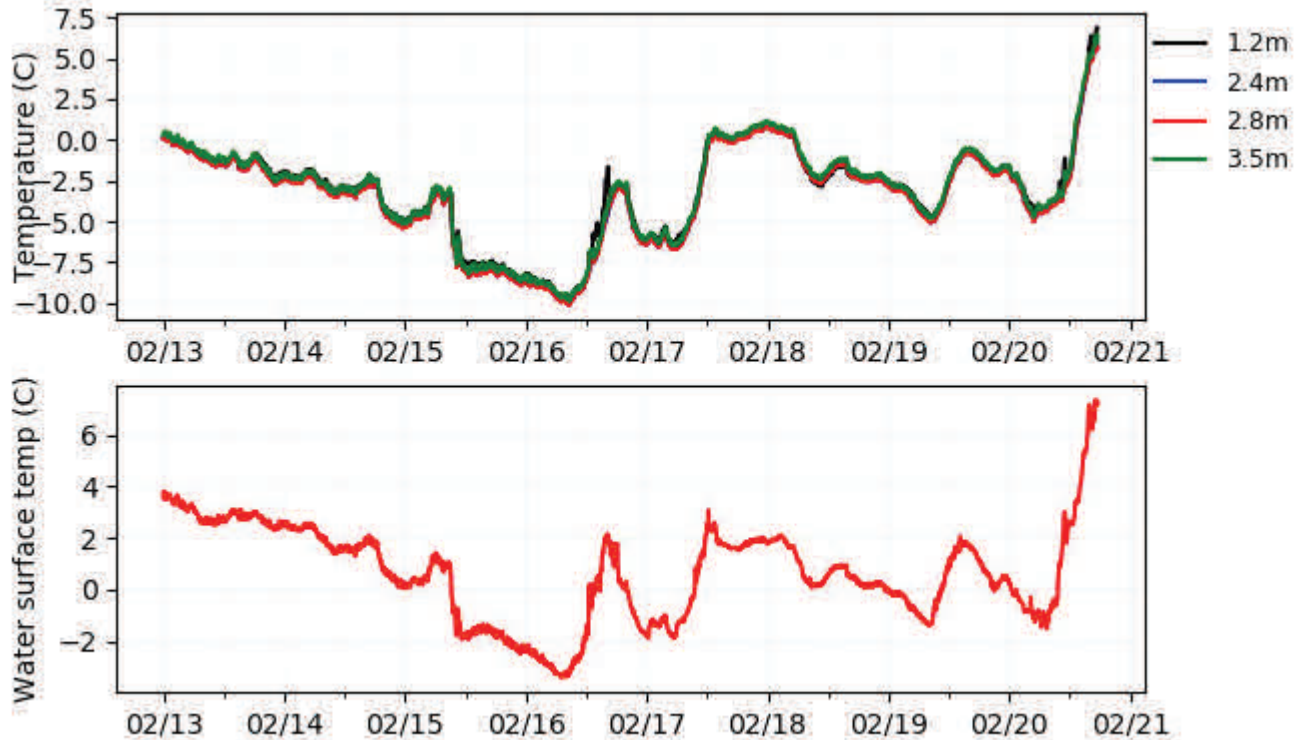


Figure 6. Air (top) and Water (bottom) temperatures track closely together.



MONTHLY POST

Dr. David T. Dockery III RPG

Though water main breaks in the winters of 2010 and 2018 caused the city to lose water pressure, this year cold water shut down capacity at the water treatment plant before it got to Jackson's water mains. Perhaps the lesson here is to store enough treated water before a cold spell so that it is not necessary to pump pipe-breaking-cold reservoir water below 37 degrees F through Jackson's water mains. The following is the WAPT report updated February 16, 2021, 5:33 pm: "Due to the extreme cold weather and low temperatures, the City of Jackson Water Treatment Plants are experiencing an inability to maintain pressure in the distribution system. Until adequate system pressure is restored some areas may experience low to no water pressure. The City of Jackson Water/Sewer Utilities Division has issued a city-wide precautionary boil water advisory until further notice for 43,000 connections. This notice includes all surface water connections but not well water connections." This year as in 2018, portable toilets were delivered to MDEQ's 700 Building (**Figure 7**).



Figure 7. Portable toilets at MDEQ's 700 Building in Jackson, Mississippi, due to low water pressure. Picture was taken February 24, 2021.



GEOLOGY POST

ARTICLES, PAPERS or NEWS?

ATTENTION!!!!!! Industry, Professors and Students:

I am adding a dedicated section that includes more content from the industry and our schools.

Submissions can include anything from professional papers, thesis abstracts, job opportunities to pictures. Anything!!!!

If you have any information or news you would like to share with the Society **PLEASE** email them to the MGS Editor at:

mcaton13@yahoo.com

Thanks & Regards,

Matt Caton
Editor



MONTHLY QUIZ

Steve Walkinshaw

OIL PATCH QUIZ

Oil patch quiz time. This country has recently focused on the development of its unconventional resources, announcing the discovery of 160 TCF of tight gas.

Oil was first discovered here ~63 years ago. Carbonates are the largest reservoirs; an image across the third field discovered in this country is shown in "A".

A tight oil and gas reservoir (and trap) is shown in images "B" - "G". This reservoir exhibits good porosity but low permeability.

A famous outcrop in a neighboring country is shown in "I".

Questions...

Part 1: What country am I referring to?

Part 2: What sector of this country harbors the most oil and gas reserves?

Part 3: What's the name and age of the most prolific reservoir in this country?

Part 4: What was the first field discovered here?

Part 5: What's the name of the third large field discovered here ("A")?

Part 6: What's labeled "M" in "B"?

Part 7: Fossils of what animals are shown in "H"?

Part 8: What's the name of the tight oil and gas reservoir shown in images "B" - "G"?

Part 9: What's the name of the famous outcrop "I"?

Part 10: In what country is it located?

Part 11: What boundary is labeled "L"?

Part 12: What type of rock is labeled "J"?

Part 13: What type of rock is labeled "K"?

Bonus:

Part 14: Collectively, what are rocks like "J" and "K" called?

Answers at end of Bulletin



MONTHLY QUIZ

Steve Walkinshaw

PSEUDO POROSITY DERIVED FROM INVERTED ACOUSTIC IMPEDANCE - HIGHLIGHTING SEQUENCE CLINOFORMS

SEM - TIGHT (GAS-PRODUCTIVE) CARBONATE RESERVOIR

3D ISOCHRONOUS (TIME) THICKNESS - GAS FIELD

FLATTENED 3D ARB LINE D ILLUMINATING CLINOFORMS

SLABBED CORE - TIGHT GAS RESERVOIR

ENLARGED IMAGE - SLABBED CORE

ORGANIC-RICH CLAY SEAM

FAMOUS OUTCROP IN NEIGHBORING COUNTRY

FULL CREDIT FOR THE SOURCE OF THESE IMAGES TO BE PROVIDED ONCE THE QUIZ HAS BEEN SOLVED

GEO LINK POST

USGS TAPESTRY OF TIME AND TERRAIN <http://tapestry.usgs.gov> The CCGS is donating to all of the 5th and 6th grade schools in the Coastal Bend. Check it out—it is a spectacular map. You might want a framed one for your own office. The one in my office has glass and a metal frame, and it cost \$400 and it does not look as good as the ones we are giving to the schools. Call Owen 510-6224 if you want one for your office for \$150. Duncan, Mike, Chris, Dave, Bob Randy, Seb., Kevin, Ken, Craig, Patrick, Robert.

FREE TEXAS TOPO'S <http://www.tnris.state.tx.us/digital.htm> these are TIFF files from your state government that can be downloaded and printed. You can add them to SMT by converting them first in Globalmapper. Other digital data as well.

FREE NATIONAL TOPO'S [http://store.usgs.gov/b2c_usgs/b2c/start/\(xcm=r3standardpitrex_prd\)/.do](http://store.usgs.gov/b2c_usgs/b2c/start/(xcm=r3standardpitrex_prd)/.do) go to this webpage and look on the extreme right side to the box titled TOPO MAPS DOWNLOAD TOPO MAPS FREE.

<http://www.geographynetwork.com/> Go here and try their top 5 map services. My favorite is 'USGS Elevation Date.' Zoom in on your favorite places and see great shaded relief images. One of my favorites is the Great Sand Dunes National Park in south central Colorado. Nice Dunes.

<http://antwrp.gsfc.nasa.gov/apod/astropix.html> Astronomy picture of the day — awesome. I click this page everyday.

<http://www.spacimaging.com/gallery/ioweek/iow.htm> Amazing satellite images. Check out the gallery.

<http://www.ngdc.noaa.gov/seg/topo/globegal.shtml> More great maps to share with kids and students.

www.geo.org Don't forget we have our own web page.

<http://micro.magnet.fsu.edu/primer/java/scienceoptiscu/owersof10/>

<http://asterweb.jpl.nasa.gov/gallery/default.htm> Great satellite images of volcanoes

<http://terra.nasa.gov/gallery/> More here

www.ermapper.com They have a great free downloadable viewer for TIFF and other graphic files called ER Viewer.

www.drillinginfo.com This is an incredible (subscription) well and completion data service for independents. Can be demo'ed for free.

<http://terraserver.com/> Go here to download free aerial photo images that can be plotted under your digital land and well data. Images down to 1 meter resolution, searchable by Lat Long coordinate. Useful for resolving well location questions.

<http://www.fs.fed.us/gpnf/volcanocams/msh/> This is a live cam of Mt. St. Helens refreshed every 5 minutes. At the bottom are old videos of past eruptions in this cycle. It is worth a watch especially now.



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2020-2021

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(Note: Please contact Steve Walkinshaw at (601) 607-3227 or mail@visionexploration.com for details concerning placing your ad on the MGS web site.)

Total Remitted \$ _____

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1971-1972	Larry Boland	2012-2013	Jim Files
1972-1973	Charles Barton	2013-2014	Neil Barnes
1973-1974	Larry Walter	2014-2015	Ezat Heydari
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1977-1978	Sarah Childress	2018-2019	Dr. David Dockery
1978-1979	Les Aultman	2019-2020	James O. Sparks
1979-1980	Philip R. Reeves		



MONTHLY QUIZ

Steve Walkinshaw

ANSWERS & CREDITS

Part 1: What country am I referring to? the U.A.E.

Part 2: What sector of this country harbors the most oil and gas reserves? the Emirate of Abu Dhabi

Part 3: What's the name and age of the most prolific reservoir in this country? Thamama, Lower Cretaceous

Part 4: What was the first field discovered here? Umm Shaif Field

Part 5: What's the name of the third large field discovered here ("A")? Bu Hasa Field

Part 6: What's labeled "M" in "B"? a coccolith pore

Part 7: Fossils of what animals are shown in "H"? ammonites

Part 8: What's the name of the tight oil and gas reservoir shown in images "B" - "G"? the Lower Bab Formation

Part 9: What's the name of the famous outcrop "I"? it is in the Wadi Abyad

Part 10: In what country is it located? Oman

Part 11: What boundary is labeled "L"? the Moho

Part 12: What type of rock is labeled "J"? crustal rocks (layered gabbros)

Part 13: What type of rock is labeled "K"? mantle rocks (peridotite)

Part 14: Collectively, what are rocks like "J" and "K" called? Ophiolites

The name of the structure / field shown in Images "C" and "D" is Asab Field, located in the southern U.A.E.

Here are the credits for / sources of the images shown in the montage.

Images "A" through "G": "Lower Bab Member (a0): A Study Of Sequence Stratigraphy, Porosity Characterization And Tight Reservoir Development, Abu Dhabi, UAE" (Mohammad Eid Alsuwaidi, Doctoral Thesis), Colorado School of Mines

Image "H": "New insight on the stratigraphy of the "Upper Thamama" in offshore Abu Dhabi (U.A.E.)", Bruno Granier, Ahmed Saqer Al Suwaidi, Robert Busnardo, Sabah K. Aziz, and Rolf Schroeder), *Carnets de Geologie*, 2003, CG2003 (A05), pp.1-17

Image "I": "The WILLIAM & MARY Blogs", <https://wmblogs.wm.edu/cmbail/the-road-to-the-moho/>