Future Typical Meteorological Year (fTMY) US Weather Files

As global emissions and temperatures continue to rise, global climate models offer projections as to how the climate will change in years to come. These model projections can be used for a variety of end-uses to better understand how current systems will be affected by the changing climate. While climate models predict every individual year, using a single year may not be representative as there may be outlier years. It can also be useful to represent a multi-year period with a single year of data. Both items are currently addressed when working with past weather data by a using Typical Meteorological Year (TMY)methodology. This methodology works by statistically selecting representative months from a number of years and appending these months to achieve a single representative year for a given period. In this analysis, the TMY methodology is used to develop Future Typical Meteorological Year (fTMY) using climate model projections. The resulting set of fTMY data is then formatted into EnergyPlus weather (epw) files that can be used for building simulation to estimate the impact of climate scenarios on the built environment.

Public Data:

ORNL has created fTMY files for 3281 US Counties in the continental United States. These datasets are freely and publicly available all SSP/RCP combinations, for 6 models and single dataset combined across the 6 models, for 1980-2100 for every CONUS county.

Future-weather data from 1980-2100:

1) SSP5, RCP8.5 - https://zenodo.org/records/10814978

2) SSP3, RCP7.0 - https://zenodo.org/records/10698922

3) SSP2, RCP 4.5 - https://zenodo.org/records/10719179

4) SSP1, RCP2.6 - https://zenodo.org/records/10719205

Future-weather data from 1980-2100 (Model specific version):

1) SSP5, RCP8.5 - https://zenodo.org/records/10815041 https://zenodo.org/records/10815135

2) SSP3, RCP7.0 - https://zenodo.org/records/10729200 https://zenodo.org/records/10729158

3) SSP2, RCP 4.5 - https://zenodo.org/records/10729202 https://zenodo.org/records/10729224

4) SSP1, RCP2.6 - https://zenodo.org/records/10729278 https://zenodo.org/records/10729280

Recommended publications:

- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New (2023). “Multi-Model Future Typical Meteorological (fTMY) Weather Files for nearly every US County.” The 3rd ACM International Workshop on Big Data and Machine Learning for Smart Buildings and Cities and BuildSys '23: The 10th ACM International Conference on Systems for Energy-Efficient Buildings,

Cities, and Transportation, Istanbul, Turkey, November 15-16, 2023. DOI: 10.1145/3600100.3626637.

- Published Link: https://dl.acm.org/doi/10.1145/3600100.3626637
- Kudos:https://www.growkudos.com/publications/10.1145%25252F3600100.3626637/reader

Publications:

- Fengqi Li, Shovan Chowdhury, Avery Stubbings, Joshua R. New (2023). “Multi-Model Future Typical Meteorological (fTMY) Weather for nearly every US County.” AGU Fall Meeting 2023, San Francisco, CA, USA. Dec 11-15, 2023. (Abstract accepted, Oral Presentation)
- Bass, Brett, New, Joshua R. and Wade, Zachary (2022). "Future Typical Meteorological Year (fTMY) Weather Data and Climate Change Impacts to Maricopa County, Arizona." The 2nd ACM International Workshop on Big Data and Machine Learning for Smart Buildings and Cities, Boston, Massachusetts, USA. BuildSys '22: Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, pp. 504-507, doi.org/10.1145/3563357.3567408, Nov. 9-10, 2022. [ACM] [PDF] [PPT] [Vis]
- Bass, Brett and New, Joshua R. (2023). "How Will United States Commercial Building Energy Use Be Impacted by IPCC Climate Scenarios?" Journal of *Energy*, volume 263(E), doi.org/10.1016/j.energy.2022.125945, Jan. 2023. [Energy]

Data Release:

- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). " Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (Cross-Model Version-SSP1-RCP2.6)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10719205, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). " Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (Cross-Model Version-SSP2-RCP4.5)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10719179, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). " Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (Cross-Model Version-SSP3-RCP7.0)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10698922, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2023). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County (Cross-Model version-SSP5-RCP8.5)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10420668, Dec 2023. [Data]

- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (East and South - SSP1-RCP2.6)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10729280, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (West and Midwest - SP1-RCP2.6)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10729278, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (East and South - SSP2-RCP4.5)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10729202, Feb 2024. [Data]
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- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2024). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County in CONUS (West and Midwest - SP3-RCP7.0)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.10729158, Feb 2024. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2023). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County (East and South – SSP5-RCP8.5)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.8335814, Sept 2023. [Data]
- Shovan Chowdhury, Fengqi Li, Avery Stubbings, Joshua R. New, Deeksha Rastogi, and Shih-Chieh Kao (2023). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County (West and Midwest – SSP5-RCP8.5)." ORNL internal Scientific and Technical Information (STI) report, doi: 10.5281/zenodo.8338548, Sept 2023. [Data]
- Bass, Brett, New, Joshua R., Rastogi, Deeksha and Kao, Shih-Chieh (2022). "Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation (1.0) [Data set]." Zenodo, doi.org/10.5281/zenodo.6939750, Aug. 2022. [Data]