Victoria Gold Corporation
Eagle Mine Project
Project No. 109005

Prepared by:

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1. INTRODUCTION

This document has been prepared by Forte Dynamics Inc. (Forte) on behalf of Victoria Gold (Yukon) Corp. (VGC) for the Eagle Project. Each year as per Water Use License (WUL) condition #107, VGC (The Licensee) must submit to the YWB updated surface water balance and water quality models which must include updated:

a) site data collected as per the EMSAMP and the Heap Leach Facility (HLF) Solution Inventory Monitoring Program;
b) input from any updates to the HLF water balance model; and
c) predictions for Production Phase through to Permanent Closure including discussion on variances identified and implications on site water management.

Additionally, as per WUL condition #118, the annual report must include a stochastic projection of the expected water volumes stored within the HLF and Event Pond for the period of March 1 to August 31 of that year.

This report addresses the HLF water balance model specifically including the inputs and outputs for the HLF water balance. This includes updates to the HLF water balance model as well as the outputs developed for the surface water balance and water quality models as well as the stochastic projections surrounding the HLF and Event Pond.

2. INPUTS AND ASSUMPTIONS

This HLF Water Balance Model developed by Forte Dynamics is used for daily operations and uses measured meteorological and site operational data for the period in which such data are available from the July 1st, 2019 start date of the simulations to the March 1st, 2020 forecasting date. This distinction in measured and forecasted data, detailed further in this document, effects the Deterministic and Stochastic model simulations in slightly different ways, which are discussed in detail in the succeeding sections.

The HLF Water Balance Model used by Forte makes use of a large array of operational, meteorological, geotechnical, and metallurgical input data. The inputs include updated values from the previous heap water balance model developed by the Mines Group (2019) to provide site with an operational model as the mine site transitioned into production. Additional ore samples were collected, and further testing was conducted to characterize ore properties which have been used in the updated heap water balance model. Additionally, as the site has moved into operations, site operators required a model that could incorporate the daily data recorded at site, including climatic conditions, measured flows, and tonnage placed on the HLF. This updated heap water balance model incorporates an increasing detail surrounding the HLF while providing operations with the ability to utilize more recorded inputs and better understand solution and pond level management.

2.1 Modeling Timeframe

- **Deterministic Modeling:**
    - Previous Model: 14 years of operations modelled from:
        - Year -1: 2018, Construction Year
        - Year 0-9: 2019-2028, Normal Operations (stacking and leaching of HLF)
        - Year 10-13: 2029-2032, Closure
        - *Resource:* VGC
    - Updated Model: 19.5 years of operations modelled from:
        - 7/1/2019 – 2/15/2028: Normal Operations (stacking and leaching of HLF)
            - Note that a Forecasting Date of 3/1/2020 was used in modeling, beyond which, all data is forecasted. Greater detail on the forecasting of specific data is provided in subsequent sections.
        - 2/15/2028 – 1/1/2040: Residual recovery, closure, solution management (ore rinsing, discharge to treatment)
        - *Resource:* Updated VGC input with guidance from Forte engineering experience
- **Stochastic Modeling:**
    - Previous Model: 14 years of operations modelled (same timeframe used for Deterministic and Stochastic models)
        - *Resource:* VGC
    - Updated Model: 1.5 years of operations modelled from:
        - 7/1/2019 – 3/1/2020: Normal Operations (stacking and leaching of HLF)

        - 3/1/2020 is the Forecasting Date at which point the Stochastic Climate/Meteorological datasets are introduced and all data is forecasted.
    - 3/1/2020 – 1/1/2021: Normal Operations (stacking and leaching of HLF)
    - *Resource:* Updated VGC input with guidance from Forte engineering experience

2.2 Ore Properties

- **Initial Moisture Content:**
  - Previous Model: 5.84% by weight (7.93% in stockpile, 5.0% fresh)
    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 1.5% by weight
    - *Resource:* Based on site measurements taken during operation
- **Residual Moisture Content:**
  - Previous Model: 8.6% by weight
    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 8.6% by weight, corresponding to a 7.69% by weight for Brooks-Corey Calculations
    - *Resource:* Unchanged, calibrated for Brooks-Corey Residual Moisture equation
- **Active Leaching Ore Moisture Content**
  - Previous Model: 13.3% by weight
    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 14.35% - 11.46% by weight
    - *Resource:* Calculated based on current site ore properties and changes in density based on loading
- **Bulk Dry Density**
  - Previous Model: 1.72 tonne/m3
    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 1.72 tonne/m3
    - *Resource:* Unchanged
- **Density Consolidation**
  - Previous Model: Not Found
    - *Resource:* N/A
  - Updated Model: Density_Consolidated=Bulk_Density*Overburden_Depth^(Power_Factor), curve fit equation developed from test work with the Power Factor calculated as 0.0195
    - *Resource:* KCA test work at loads simulating heap depths of 0m to 170m

- **Specific Gravity**
    - Previous Model: 2.65
        - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
    - Updated Model: 2.65
        - *Resource:* Unchanged
- **Saturated Hydraulic Conductivity**
    - Previous Model: Not Found
        - *Resource:* N/A
    - Updated Model: 0.07268 cm/s (universally scaled down by 1 order of magnitude in model for in-field correction)
        - *Resource:* VGC site measurements and calibrated model confirmation
- **Saturated Hydraulic Conductivity Consolidation**
    - Previous Model: Not Found
        - *Resource:* N/A
    - Updated Model: K_sat_consolidated=Density_Consolidated*Slope+Intercept, linear fit equation developed from test work with Slope=-0.2285 and Intercept=0.4657
        - *Resource:* KCA test work at loads simulating heap depths of 0m to 170m
- **SCS Curve Number – Loaded HLF**
    - Previous Model: 70 for all ore, see later section and runoff discussion for more information
        - *Resource:* engineering judgement and prior experience
    - Updated Model: 70 for un-leached ore, 91 for leached ore
        - *Resource:* engineering judgement and prior experience
- **SCS Curve Number – Un-loaded HLF**
    - Previous Model: 99 for un-loaded HLF area, treated as bare HDPE liner surface
        - *Resource:* engineering judgement and prior experience
    - Updated Model: 99 for un-loaded HLF area, treated as bare HDPE liner surface
        - *Resource:* engineering judgement and prior experience

2.3 Heap Leach Facility Parameters

- **Total Tonnes:**
    - Previous Model: 86Mt
        - *Resource:* VGC provided
    - Updated Model: 86Mt
        - *Resource:* Unchanged
- **Loading Months:**
    - Previous Model: April through December each year (9 months of loading)
        - *Resource:* VGC provided

  - Updated Model: April through December each year (9 months of loading)
    - *Resource:* Unchanged
- **Ultimate Elevation:**
  - Previous Model: 1150m above mean sea level
    - *Resource:* VGC provided
  - Updated Model: 1225m above mean sea level
    - *Resource:* VGC provided, updated ultimate HLF design
- **Lift Height:**
  - Previous Model: 10m
    - *Resource:* VGC provided
  - Updated Model: 10m
    - *Resource:* Unchanged
- **Precipitation Soak-up/Initial Abstraction of Precipitation:**
  - Previous Model: SCS Curve Number Excess Moisture Method Used
    - *Resource:* engineering judgement and prior experience
  - Updated Model: SCS Curve Number Excess Moisture Method Used
    - *Resource:* Unchanged
- **Evaporation Loss from Drip Emitters:**
  - Previous Model: 0.5% only in months with average daily temperatures above 0 Celsius
    - *Resource:* VGC provided, buried drip emitters in sub-zero months
  - Updated Model: 0.5% only in months with average daily temperatures above 0 Celsius
    - *Resource:* Unchanged

2.4 Operational Parameters

- **Initial Leach Cycle:**
  - Previous Model: Not found
    - *Resource:* N/A
  - Updated Model: 45 days
    - *Resource:* VGC updated with actual planned operations
- **Leaching Application Rate:**
  - Previous Model: 7 L/hr/m2 for ore
    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 7 L/hr/m2 for fresh and aged ore
    - *Resource:* Unchanged
- **Target Plant Flow Rate:**
  - Previous Model: 1500 m3/hr, varies through start-up and dependent on total available area for leaching

    - *Resource:* Wardrop, Tetra Tech, Knight-Piesold Reports
  - Updated Model: 1500 m3/hr, varies through start-up and dependent on total available area for leaching, see Additional Discussion for more information on how this was treated for modeling of the mine closure in the Deterministic Modeling
    - *Resource:* Unchanged
  - Additional Discussion: For the updated Deterministic Model simulations performed by Forte, additional specificity of the plant flow rate and its effects on overall solution management is necessary.
    - *From the model start date (7/1/2019) to the model forecasting date (3/1/2020):* The measured Total Plant Flow Rate is used.
    - *After the forecasting date:* During normal operations (following initial ramp-up during development of the HLF), the Target Plant Flow Rate is a maximum of 1500 m3/hr limited by the Leaching Application Rate with the Evaporation Loss from Drip Emitters being subtracted off in the applicable months. The total flow rate to the HLF is determined by the amount of ore loaded. As additional ore is loaded, and the area available for leaching increases, the flowrate to the HLF gradually is increased to the targeted maximum of 1500 m3/hr.
    - *Once the mine reaches the end of loading (1/1/2028):* After one complete Leach Cycle of the last ore loaded (45 days), the Make-up Water supply is turned off, at which point solution begins to be managed through the discharge of barren solution to treatment, in order to reduce total volume of solution in the system. At this point in time (2/15/2028), the solution circulation pumping operation is changed to only circulate solution on an as-needed basis as dictated primarily by the volume of solution stored in the In-Heap Pond. As water is gradually removed from the system via this discharge to treatment, gold rinsing continues with the overall total flow recirculation staying above 1000 m3/hr for over 2 years after the supply of Make-up Water is turned off. More information for the modeling of Make-up Water, Discharge to Treatment, Leach Cycle, In-Heap Pond, and Event Pond can be found in each of those respective sections.

- **Discharge to Treatment Rate:**
  - Previous Model: 8 L/s as needed for freshet management after operating year 5 (2023), 12.1 L/s after stacking is complete from year 9 to closure (2027 to 2030), 19 L/s after 2030
    - *Resource:* engineering judgement and model development
  - Updated Model: 12.1 L/s after stacking and initial leach cycle for loaded ore is complete (2/15/2028 to 1/1/2030), 19 L/s after 2030

    - *Resource:* The 12.1 and 19 L/s discharge to treatment rates used in the updated model were selected based on engineering judgement by Forte to match previous assumptions while maintaining a maximum rate of less than 20 L/s per VGC direction.

- **Event Pond Storage:**
  - Previous Model: 299,851 m3 maximum, 0.5 m Freeboard Volume of 19,578 m3
    - *Resource:* 2018 HLF Design Report
  - Updated Model: 299,900 m3 maximum, 0.5 m Freeboard Volume of 19,325 m3
    - *Resource:* As-built surveyed volume
  - Additional Discussion: For all of the modeling simulations performed by Forte, the Event Pond was modeled being the first source of additional solution required to meet leaching demands. As such, the Event Pond level is modeled more actively maintained at sub-10% of maximum levels during normal leaching operations prior to the end of loading. Then, after 2/15/2028, the Event Pond is allowed to gradually fill up from meteoric conditions to the DAS level prior to being pumped out and recirculated through the system, eventually returning to the In-Heap Pond. During this same time period the In-Heap Pond level is primarily managed by recirculation and through discharge to treatment.
- **In-Heap Pond Storage Volume:**
  - Previous Model: 52,223 m3 (always occupied during operation), 74,565 m3 (maximum available storage volume during operation before overflowing to the Event Pond)
    - *Resource:* Forte calculation prior to completion of as-built documentation and geotechnical testing
  - Updated Model: 63,338 m3 (always occupied during operation), 53,803 m3 (maximum available storage volume during operation before overflowing to the Event Pond)
    - *Resource:* Forte calculation updated with as-built survey information and placed density and particle size distribution of In-Heap Pond material. This is currently based on best assumptions of placed material based on material properties, adjusted for consolidation. This volume will be verified after the conclusion of the in-heap pond verification test.
  - Additional Discussion: For all of the modeling simulations performed by Forte, the In-Heap Pond was drawn from in the following way:
    - The measured plant flow rate from 7/26/2019 to 3/1/2020
    - As much as possible to maintain the circulation of the targeted flow rate of 1500 m3/hr, with that flow rate acting as the maximum total withdrawal rate from the In-Heap Pond throughout the entire mine life beginning 3/1/2020.

    - As much as possible to maintain the target for Discharge to Treatment rates with those rates acting as the maximum solution removal rates from the system beginning 2/15/2028.
- **Desired Available Storage Volume:**
  - Previous Model: 183,510 m3 (Extreme Precipitation Reference Event as described below plus a 0.5 m Freeboard Volume buffer as described previously)
  - Updated Model: 183,259 m3 (Extreme Precipitation Reference Event as described below plus a 0.5 m Freeboard Volume buffer as described previously)
    - *Resource:* 0.5 m Freeboard Volume updated based on as-built survey.

2.5 Meteorological Inputs and Parameters

- **Extreme Precipitation Reference Event:**
  - Previous Model: 54 mm (24-hr, 100 yr Event) maximum volume of 58,733 m3 plus a 72-hr Heap Draindown of 105,199 m3, for a total volume of 163,932 m3.
    - *Resource:* Lorax, 2017 meteorological data, using design values regarding catchment area for final HLF (catchment area for the In-Heap Pond and Event Pond through closure)
  - Updated Model: 54 mm (24-hr, 100 yr Event) volume of 58,733 m3 plus a 72-hr Heap Draindown of 105,199 m3, for a total volume of 163,932 m3.
    - *Resource:* Unchanged
- **Precipitation Data used in Deterministic Modeling:**
  - Previous Model: three separate sets of data consisting of 14 yearly sets of daily climate data were selected from the Lorax Site Synthetic dataset. For each of these three sets of data, data from 14 individual years were selected to represent different types of years (e.g. dry with low variability, average with moderate variability, wet with high variability, etc.) and were converted from daily into weekly sets. For precipitation, the number of days in a week with precipitation was added to the data set upon conversion to a weekly time-step. For more information, see pages 18-21 from Mines Group (2019).
    - *Resource:* Lorax Site Synthetic dataset from 1948-2016
  - Updated Model: Two updated, separate composite sets of data provided by Lorax were used by Forte for the updated water balance model.
    - 1000m Set: The daily Site Synthetic data is used through 2019 with the data from the hydrologic 2016 year (Oct 2015 to September 2016) repeated as a typical year from start of 2020 through closure.
    - Climate Change Set: This set has the identical basis as the 1000m set (Site Synthetic through 2019, 2016 data repeated for years 2020 through 2099);

        however, Lorax provided a data set to incorporate the effects of climate change on the weather at the site
    - *Resource:* Lorax 1000m and Climate Change (CC) data sets provided to Forte in 2020
    - Refer to Figures 1-4 below

- **Evaporation Data used in Deterministic Modeling:**
  - <u>Previous Model:</u> One set of average weekly potential evaporation was created for the site from the Lorax Site Synthetic data set. This evaporation data was originally produced by using measured temperature, precipitation, wind speed, solar radiation, and other factors necessary for the Penman-Monteith and Priestly-Taylor energy balance methods for calculating evapotranspiration. For more information, see page 28 of the Mines Group (2019).
    - *Resource:* Lorax Site Synthetic dataset from 1948-2016
  - <u>Updated Model:</u> Two updated, separate composite sets of data provided by Lorax were used by Forte for the updated water balance model.
    - 1000m Set: The daily Site Synthetic data is used through 2019 with the data from the hydrologic 2016 year (October 2015 to September 2016) repeated as a typical year from start of 2020 through closure.
    - Climate Change Set: This set has the identical basis as the 1000m set (Site Synthetic through 2019, 2016 data repeated for years 2020 through 2099); however, Lorax provided a data set to incorporate the effects of climate change on the weather at the site.
    - *Resource:* Lorax 1000m and Climate Change (CC) data sets provided to Forte in 2020
    - Refer to Figures 5-8 below
- **Temperature Data used in Deterministic Modeling:**
  - <u>Previous Model:</u> One set of average weekly temperatures was created for the site from the Lorax Site Synthetic data set. This dataset was originally produced using 68 years of collected data from the site area. For more information, see page 26 of the Mines Group (2019).
    - *Resource:* Lorax Site Synthetic dataset from 1948-2016
  - <u>Updated Model:</u> Two updated, separate composite sets of data provided by Lorax and were used by Forte for the updated water balance model.
    - 1000m Set: The daily Site Synthetic data is used through 2019 with the data from the hydrologic 2016 year (October 2015 to September 2016) repeated as a typical year from start of 2020 through closure.

        - Climate Change Set: This set has the identical basis as the 1000m set (Site Synthetic through 2019, 2016 data repeated for years 2020 through 2099); however, Lorax provided a data set to incorporate the assumed effects of climate change on the weather at the site.
        - *Resource:* Lorax 1000m and Climate Change (CC) data sets provided to Forte in 2020
        - Refer to Figures 9-12 below
- **Stochastic Sampling and Iterations:**
    - Previous Model: Latin Hypercube Sampling, 5000 iterations/realizations
        - *Resource:* Engineering and statistical modeling experience
    - Updated Model: Latin Hypercube Sampling, 100 iterations/realizations
        - *Resource:* Engineering and statistical modeling experience updated to reflect the added robustness and detail of the updated operational model with a quarter day timestep.
- **Precipitation Data used in Stochastic Modeling:**
    - Previous Model: Descriptive statistics (mean and standard deviation) were performed on the 71 years of daily Site Synthetic data to produce a one-year data set with weekly precipitation and numbers of days of precipitation per week. This data was then sampled from for the long-term stochastic modeling of the make-up water and pond volumes. For more information, see page 24 from the Mines Group (2019).
        - *Resource:* Lorax Site Synthetic dataset from 1948-2016
    - Updated Model:
        - 7/1/2019 to 3/1/2020: Measured data (taken from the 1000m Dataset) is used to represent data prior to the Forecasting Date.
        - 3/1/2020 to 1/1/2021: WGEN (Richardson and Wright, USDA, 1984) with up-front detailed descriptive statistic parameter generation was used on the 71 years of daily Site Synthetic data. Using the stochastic sampling and iterations described previously, 100 realizations of data were produced for each day of data for Precipitation, Maximum and Minimum Temperature, Evaporation, and Solar Radiation.
        - *Resource:* Lorax Site Synthetic dataset from 1948-2019 provided to Forte in 2020.
        - Refer to Figures 13 and 14 below
- **Evaporation Data used in Stochastic Modeling:**
    - Previous Model: Descriptive statistics (mean and standard deviation) were performed on the 68 years of daily Site Synthetic data to produce a one-year data set with weekly evaporation. This data was then sampled from for the long-term stochastic modeling of the

make-up water and pond volumes. For more information, see page 24 of the Mines Group (2019).

        - *Resource:* Lorax Site Synthetic dataset from 1948-2019
    - Updated Model:
        - 7/1/2019 to 3/1/2020: Measured data (taken from the 1000m Dataset) is used to represent data prior to the Forecasting Date.
        - 3/1/2020 to 1/1/2021: Refer to the Precipitation Data used in Stochastic Modeling section for a description of how the 100 yearly Realizations of data were produced for Precipitation, Maximum and Minimum Temperature, Evaporation, and Solar Radiation.
        - *Resource:* Lorax Site Synthetic dataset from 1948-2019 and Lorax 1000m Climate Series provided to Forte in 2020.
        - Refer to Figures 15 and 16 below
- **Temperature Data used in Stochastic Modeling:**
    - Previous Model: Descriptive statistics (mean and standard deviation) were performed on the 68 years of daily Site Synthetic data to produce a one-year data set with weekly precipitation and numbers of days of precipitation per week. This data was then sampled from for the long-term stochastic modeling of the make-up water and pond volumes. For more information, see page 24 of the Mines Group (2019).
        - *Resource:* Lorax Site Synthetic dataset from 1948-2016
    - Updated Model:
        - 7/1/2019 to 3/1/2020: Measured data (taken from the 1000m Dataset) is used to represent data prior to the Forecasting Date.
        - 3/1/2020 to 1/1/2021: Refer to the Precipitation Data used in Stochastic Modeling section for a description of how the 100 yearly Realizations of data are produced for Precipitation, Maximum and Minimum Temperature, Evaporation, and Solar Radiation. As WGEN outputs the Minimum and Maximum Average Daily Temperature, the Forte model calculates the Overall Average Daily Temperature from these.
        - *Resource:* Lorax Site Synthetic dataset from 1948-2019 and Lorax 1000m Climate Series provided to Forte in 2020.
        - Refer to Figures 17 and 18 below
- **Solar Radiation Data used in Stochastic Modeling:**
    - Previous Model: Solar Radiation was not shown to be explicitly used
        - *Resource:* N/A
    - Updated Model:

    - 7/1/2019 to 3/1/2020: The monthly average from the Solar Radiation dataset (Eagle Climate Data) is used to represent data prior to the Forecasting Date.
    - 3/1/2020 to 1/1/2021: Refer to the Precipitation Data used in Stochastic Modeling section for a description of how the 100 yearly Realizations of data are produced for Precipitation, Maximum and Minimum Temperature, Evaporation, and Solar Radiation. The Solar Radiation is used in the calculation of Evapotranspiration specifically for the HLF.
    - *Resource:* Lorax Eagle Climate Data provided to Forte in 2020.
    - Refer to Figure 19 below

- **Evapotranspiration Calculated on HLF Only:**
  - Previous Model: Used evapotranspiration calculations implicit in Lorax's provided evaporation
    - *Resource:* Lorax Site Synthetic data from 1948-2016
  - Updated Model: Specifically, for the HLF, the Eagle Climate Data was used for the solar radiation, wind speed, and relative humidity necessary (along with temperature data from the 1000m and Climate Change data) for the calculation of evapotranspiration. The evaporation data provided directly in the 1000m and Climate Change datasets were used directly for the ponds.
    - *Resource:* Lorax 1000m and Climate Change (CC) data sets provided to Forte in 2020, calculations/technique determined by Forte from engineering and HLF modeling experience
- **Sublimation Calculated:**
  - Previous Model: When the average temperature is below 0 Celsius, Sublimation equals 20% of the weekly Precipitation and Evaporation is negligible.
    - *Resource:* Lorax Site Synthetic dataset from 1948-2016
  - Updated Model: Sublimation is calculated using heat transfer principles and is included implicitly within the Snow 17 (Snow Accumulation and Ablation, Anderson, 2016) submodel used by Forte discussed in greater detail below.
    - *Resource:* Lorax 1000m, Climate Change (CC), and Site Synthetic data sets provided to Forte in 2020 as the necessary inputs for Snow 17 (Snow Accumulation and Ablation, Anderson, 2016)
  - Additional Discussion: Snow 17 uses heat transfer and energy balance methodologies to calculate the energy exchange at the snow-air interface taking into account latent and sensible heat exchange, vapor pressure differential, dew-point temperature.
- **Snowfall, Rain, and Melt:**

- Previous Model: Estimates the Snow Water Equivalent (SWE) based on the greater of the two following results added to the previous month's SWE:
  - 1) Precipitation is treated as snow with SWE based on Temperature:
    - For Temperatures less than -3 Celsius, the new SWE equals 40% of the Precipitation
    - For Temperatures -3 and 0 Celsius, the new SWE equals 20% of the Precipitation
    - For Temperatures above 0 Celsius, no SWE is added
  - 2) Snowpack Factor*(Cumulative Water Year Precipitation – Cumulative Water Year Evaporation & Sublimation)
  - Rain and Melt are the lesser of:
    - Current Month's Precipitation – (Current Month's SWE – Last Month's SWE), or
    - 0 (zero)
  - For the division of rain and melt as runoff versus infiltrating flow, if the temperature is above 0 Celsius for 4 consecutive days, all moisture from precipitation is treated entirely as run-off
  - *Resource:* Lorax Site Synthetic dataset from 1948-2016, Lorax provided snowpack information and Snowpack Factors were developed by the Mines Group (2019) (see page 30 for more information).
- Updated Model: The division of precipitation between rain and snow and the calculation of Snow Water Equivalent and excess water (rain and melt) are modeled by Forte using the Snow 17 submodel. The Snow 17 submodel takes average daily temperature and precipitation as the critical inputs but also corrects for seasonal solar radiation changes, latitude and altitude in the implicit calculations of melt factor and lapse rate most notably. Snow 17 also makes use of daily heat deficit accounting for determination of the internal condition of the snowpack based on the net heat transfer effects caused by the daily temperature and precipitation at the snow surface. In February of 2020 the Eagle site completed a snow survey including SWE, which was compared against the model predicted SWE and they were seen to be the same. In the future, as more data becomes available, this will continue to be evaluated for accuracy in representing snowpack and freshet conditions. This method for calculating SWE allows for greater precision, addressing the differences between the climate conditions for individual days as well as tracking the internal snow conditions through time.

3. RESULTS AND DISCUSSION

Please refer to figures 19-34 below for the following discussion of the Deterministic modeling performed from 7/1/2019 through 12/31/2039 and of the Stochastic modeling performed from 7/1/2019 through 12/31/2020.

3.1 Deterministic Modeling Results

Deterministic modeling of the HLF was performed using two sets of Climate/Meteorological data provided to Forte by Lorax labeled in the graphs and discussed below as "1000m" and "Climate Change"/"CC". Lorax stated that the basis of both sets of data before 1/1/2020 is historic and after 1/1/2020 is the 2016 calendar year of climate records. The key difference between the 1000m and CC data are changes to account for the impact of climate change for the Eagle site. For the 20+ year timeline modeled by Forte in the Deterministic modeling, the results were consolidated into Monthly datasets and graphed as such.

- **Total Available Storage Volume vs Desired Available Storage**
  - The Maximum Total Available Storage Volume is **354,380 m^3**, which is calculated by subtracting the amount of solution stored in the In-Heap and Event Ponds from the Maximum Total Storage Volume:
    - 117,141 m3 (In Heap Pond Total Volume) – 63,338 m3 (Occupied In-Heap Pond Volume) = **53,803 m3** (Maximum Available In-Heap Pond Storage Volume)
    - **299,851 m3** (Maximum Available Event Pond Storage Volume)
    - **299,851 m3 + 53,803 = 353,654 m3**
  - For both the 1000m and Climate Change datasets and model runs, the total available storage volume never fell below the Desired Available Storage (DAS) volume necessary to hold the additional volume from the 100-yr 24-hour rainfall runoff event plus a 72-hour draindown while still maintaining 0.5 m freeboard in the Events Pond or 183,259 m3 (license states DAS must be 198,340 for Phase 1). The minimum average monthly total available pond storage volume resulting from the Deterministic modeling for the Climate Change dataset was 274,414 m3 and for the 1000m dataset was 274,795 m3.
  - Refer to Figures 20-23 below
- **Total Flow to Plant and Drainage from Heap**
  - The Total Flow to Plant (presumed to flow through the plant with negligible changes in volume to be pumped back to the HLF) and Drainage from HLF rates represent the measured and forecasted values of the "barren" solution flow rate pumped to the HLF and the "pregnant" solution reporting back to the In-Heap Pond from the HLF respectively.
  - Total Flow to Plant:
    - From 7/1/2019 to about 1/1/2022, the rate slowly increases over this period and is primarily a function of the increasing HLF area available for leaching at the planned solution application rate of 7 L/hr/m2 as the HLF is being developed. The gradual

increase in this rate reflects the increase in ore loaded onto the HLF and the total area available for barren solution application.

- From about 1/1/2022 to 2/15/2028, this rate is primarily a function of the Target Plant Flow Rate of 1500 m3/hr and this rate is seen to stay near the 1500 m3/hr target throughout most of this time period. Periodic drops below the 1500 m3/hr target are primarily due to the evaporative losses and short-term shortfalls in stored solution in the ponds. These slight dips can be correlated with both peaks in the total volume available for storage and the Make-Up Water supply indicating that water is being added into the system to maintain the Target Plant Flow Rate (Figure 24 and Figure 25). These periodic drops in the Total Flow to Plant also coincide with the winter months in which the stacking of new ore onto the HLF is continued from October through December prior to stacking being halted from January through March. As the contribution of additional stored solution volume from precipitation ceases due to consistent sub-zero temperatures, the ponds are first emptied to meet the leaching requirement, thus triggering the need for Make-Up Water. During this period, there is a net deficit of solution in the HLF system until the stacking and initial leaching of new ore is ceased at the end of December when the operational moisture content is achieved. In about January, when no new ore is loaded and the site averages sub-zero temperatures, the HLF and ponds effectively “catch-up” as the previously added Make-Up Water (needed to wet the newly loaded ore in the absence of added precipitation) completes its drainage through the HLF. From January through the freshet runoff until about mid-May, there is sufficient volume of solution maintained in the In-Heap Pond to consistently meet the leaching demand and thus the Total Flow to Plant can be consistently maintained near the 1500 m3/hr target leaching rate. The updated model now captures the in-heap pond as a live volume with the simulation of drainage from the HLF. When the Drainage Rate is higher that the Target Plant Flow Rate, solution is accumulated in the pond and when Drainage Rate is lower than the Target Plant Flow Rate, solution is withdrawn from the ponds to meet the Target Plant Flow Rate requirement. In the event that there is not enough solution to meet the Target Plant Flow Rate requirement, the demand for Make-Up Water is triggered as shown in Figure 28 and Figure 29.
- From 2/15/2028 to about 1/1/2033, this rate is primarily a function of the availability of solution in the In-Heap Pond. Beginning in 2/15/2028, barren solution is pumped from the In-Heap Pond and discharged to treatment to begin reducing the total solution in the system. The Total Flow to Plant demand for solution from the In-

    Heap Pond becomes secondary after the initial leach cycle is completed on the last ore loaded onto the HLF. Solution from the In-Heap Pond is actively pumped out to be discharged to treatment as the top priority and the remaining solution/water is recirculated to the HLF for storage within the ore to maintain the DAS while residual gold recovery continues. Likewise, the Event Pond is actively maintained but as a lower priority than the In-Heap Pond, maintaining the DAS capacity.
    - At about 1/1/2033, the In-Heap Pond reaches sufficiently low levels that the Discharge to Active Treatment is no longer needed. This results in the termination of the need for continuous recirculation of solution and the point at which the Total Flow to Plant falls to zero in perpetuity, and the flow from the pond is directed to the HLF passive treatment system.
  - Drainage from Heap
    - Generally, the Drainage from Heap is a function of the Total Flow to Plant with the addition of meteorological factors. Energy transfer (e.g. sublimation of snow and evapotranspiration) is applied at the surface of the HLF as well as the percentage of precipitation (rain or melt) that infiltrates into the HLF. Note that the portion of this precipitation that does not infiltrate into the HLF reports to the In-Heap Pond in a more direct route and infiltrates into the ore at the lowest surface elevation of the heap pad.
    - From 7/1/2019 to about 1/1/2021, the early development phase of the HLF, the Drainage from HLF lags slightly behind the Total Flow to Plant.
    - From about 1/1/2021 to about 2/1/2030, throughout the main operational period and the beginning of the ramp down of the HLF, the Drainage from HLF follows closely to the Total Flow to Plant with fluctuations indicative of the effects of climate on the HLF.
    - After about 2/1/2030, the effect of climate (most notably increases in precipitation and melt associated with the spring freshet runoff period) becomes a bigger driver for drainage and for solution management through time as the overall solution in the system is reduced.
  - Refer to Figures 24-27 below
- **Make-Up Water and Discharge to Treatment Rates**
  - The Make-Up Water is taken as the difference between the solution demand for leaching of ore on the HLF and the available solution in both the In-Heap and Event Ponds sent through the plant. The Make-Up water requirement is generally seasonal, up until the Make-Up Water supply is shut off to facilitate the closure of the HLF in 2/15/2028. The

  Make-Up Water requirement is reduced to near zero levels around February each year. This coincides with the middle of the three-month period in which the mine does not load fresh ore onto the HLF. Once the runoff from snow melt is completed in about mid-May each year, the demand for Make-Up Water from an outside source begins to increase and fluctuate through the summer until the average temperature falls below 0 Celsius. Once the site is generally below freezing in about October, precipitation no longer adds significantly to the In-Heap Pond Volume and the requirement for Make-Up Water reaches its highest levels throughout the remaining period of the winter in which the mine continues to stack new ore on the HLF.

  - The Discharge to Treatment Rates used by Forte matched the previous model with an updated solution management strategy to reduce solution earlier while residual gold recovery continues from the HLF with the majority of solution continuing to be recirculated through the HLF. This will serve to continue producing gold while gradually reducing solution in the system; approximately 1000 m3/hr is maintained in circulation through the HLF for more than 2 years after the initiation of the Discharge to Treatment.
    - After the end of the initial leach cycle of the last ore loaded is complete on 2/15/2028, discharge to treatment begins at a constant rate of 12.1 L/s. This rate is maintained without interruption until it is increased on 1/1/2030 to 19 L/s per previous model runs, Forte engineering judgement, and site direction to not exceed a Discharge to Treatment rate of 20 L/s. This rate is continuously maintained until about 1/1/2033 at which point meteoric input drives the flow to treatment rate.
  - Refer to Figures 28-31 below

- **Snow Water Equivalent**
  - The Snow Water Equivalent (SWE) as modeled by the Snow 17 method shows both the 1000m and Climate Change datasets repeatedly peaking in April of each year, reaching zero (signifying complete melt) in June of each year, and beginning to increase again in September of each year. The Climate Change dataset yields greater and lesser maximum SWE values than the repeated 1000m dataset indicating that some years the overall effect of the increased temperature will outweigh the effect of the increased precipitation resulting in lower SWE values while in other years the exact reversal of effects is seen.
  - Refer to Figures 32-35 below

3.2 Stochastic Modeling Results

Stochastic modeling of the HLF was performed using Climate/Meteorological data generated utilizing WGEN and historic data records. For each model run, measured data was taken from the 1000m climate series dataset from 7/1/2019 to 3/1/2020 at which point the stochastically created Climate/Meteorological data was used. The basis of the stochastically created data is the 71-year Site Synthetic data provided by Lorax which was used in the WGEN model to produce 100 realizations of daily climate data for a single-year record. For the 1.5-year total timeline modeled by Forte in the Stochastic modeling, the results were consolidated into Weekly datasets and graphed as such.

- **Total Available Storage Volume vs Desired Available Storage**
    - The Maximum Total Available Storage Volume is 353,654 m^3, which is calculated by subtracting the amount of solution stored in the In-Heap and Event Ponds from the Maximum Total Storage Volume:
        - 117,141 m3 (In Heap Pond Total Volume) – 63,338 m3 (Occupied In-Heap Pond Volume) = 53,803 m3 (Maximum Available In-Heap Pond Storage Volume)
        - 299,851 m3 (Maximum Available Event Pond Storage Volume)
        - 299,851 m3 + 53,803 = 353,654 m3
    - Only the freshet and summer period from 3/1/2020 to 8/31/2020 were graphed to show the highest resolution in the period in which the Total Available Storage Volume reaches its minimum for all datasets.
    - The minimum (corresponding to the 1st Percentile/Lower "Tail") that the weekly minimum Total Available Storage Volume reaches 164,071 m3 in the week of June 1st, 2020. This means that there would be a 19,188 shortage in Total Available Storage when compared to the Desired Available Storage Volume of 183,259 m3 (note that the Extreme Precipitation Event volume is 163,932 m3). The 5th Percentile Total Available Storage Volume did not yield a shortage when compared to the Desired Available Storage.
        - There was found to be a 3.4% probability of a shortfall with respect to the Desired Available Storage. Given that the probability of the Extreme Precipitation Event (100 yr, 24 hr) from which the Desired Available Storage is calculated is 1%, this means that the overall probability of a storage shortfall occurring at the site would be 0.034%. The Total Available Storage and Extreme Precipitation Events are treated as independent and thus their probabilities are multiplied.
    - The minimum Total Available Storage Volume falls between the weeks of May 25th and June 8th corresponding to about one to three weeks after the weekly average temperatures begin consistently exceeding 0 Celsius. This is also the period in which the SWE values decrease incredibly rapidly signifying the freshet run-off period.
    - Refer to Figure 36 below

- **Snow Water Equivalent**
    - For the Stochastic modeling, the simulated SWE values reach their maximum between mid-April and mid-May with all of the maximum SWE values between 225mm and 255mm. VGC provided measured site wide SWE estimates averaged from several on-site measurements of 210mm on 2/20/2020 showing that the modeled SWE corresponds well to this measured site value. In all datasets, the SWE shows a decrease from the peak value to about zero over the course of the month of May with variations correlated to variations in the climate input data, especially precipitation and temperature.
    - Refer to Figure 37 below

4. CONCLUSION/SUMMARY

4.1 Deterministic Modeling

For both the 1000m and Climate Change climate datasets presented on a monthly basis:

- The Total Available Storage Volume available in the In-Heap and Event Ponds never falls below the DAS volume.
    - Implicit in this is that the Event Pond never overflows through the spillway.
    - By turning off the supply of Make-Up water, turning on a first priority 12.1 L/s Discharge to Treatment (increased to 19 L/s in 2030) and maintaining secondary recirculatory pumping after all of the ore has been loaded onto the HLF and undergone initial leaching, the HLF can maintain volumes below the DAS threshold volume.

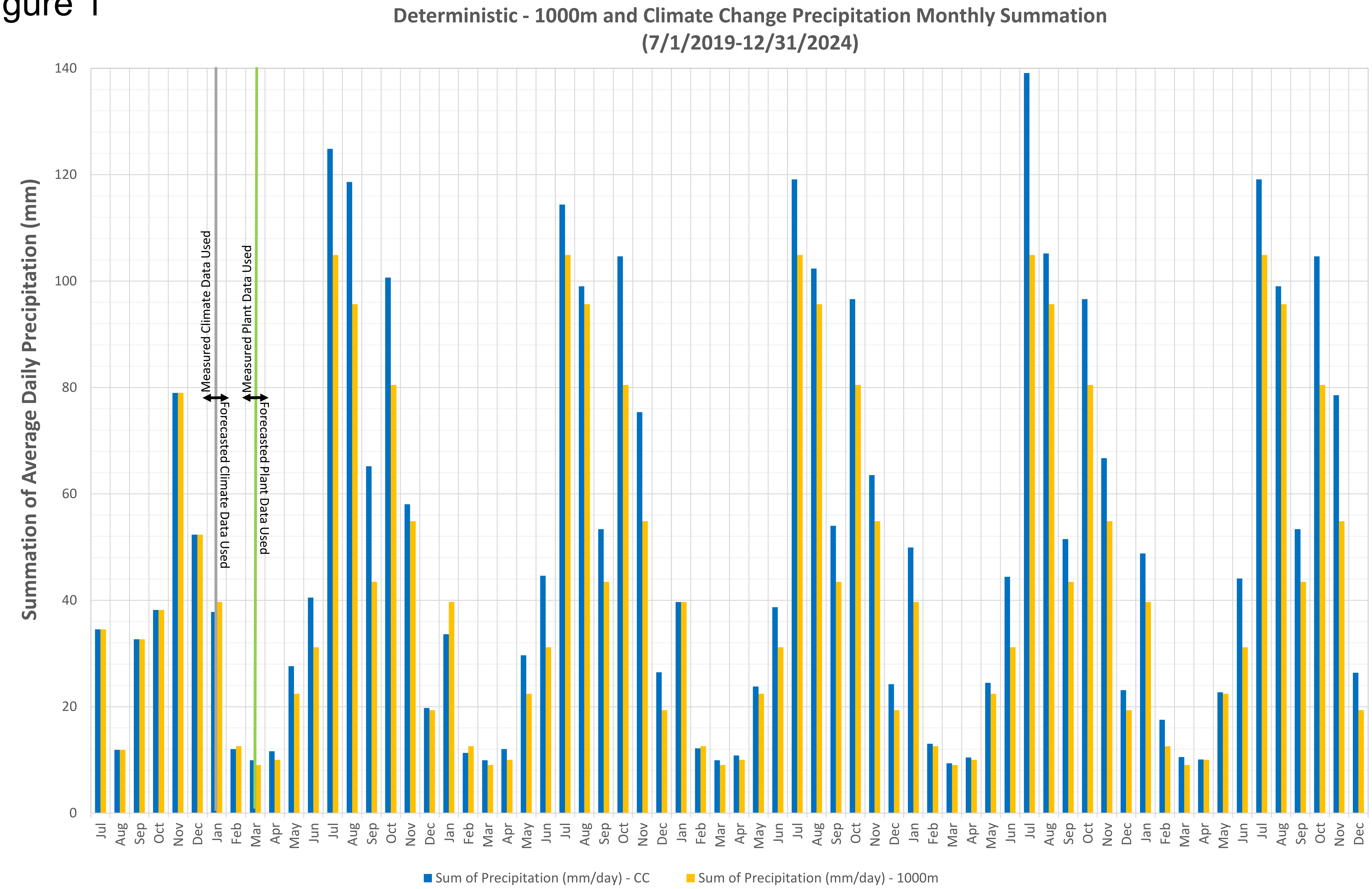
4.2 Stochastic Modeling

For all stochastically generated climate datasets presented on a weekly basis:

- The Total Available Storage Volume available in the In-Heap and Event Ponds has a 3.4% probability of falling below the maximum DAS volume required.
    - The Event Pond never overflows in any realization.
    - For the 0.034% probability (or less than 4 times in 10,000 years), if the precipitation event were to occur at the point in time where the lowest available storage occurred, the Event Pond does not overflow, and the volume would be just over the 0.5 meter of freeboard level in the Event Pond.

Figures

Figure 1



Deterministic - 1000m and Climate Change Precipitation Monthly Summation (7/1/2019-12/31/2024)

Figure 2

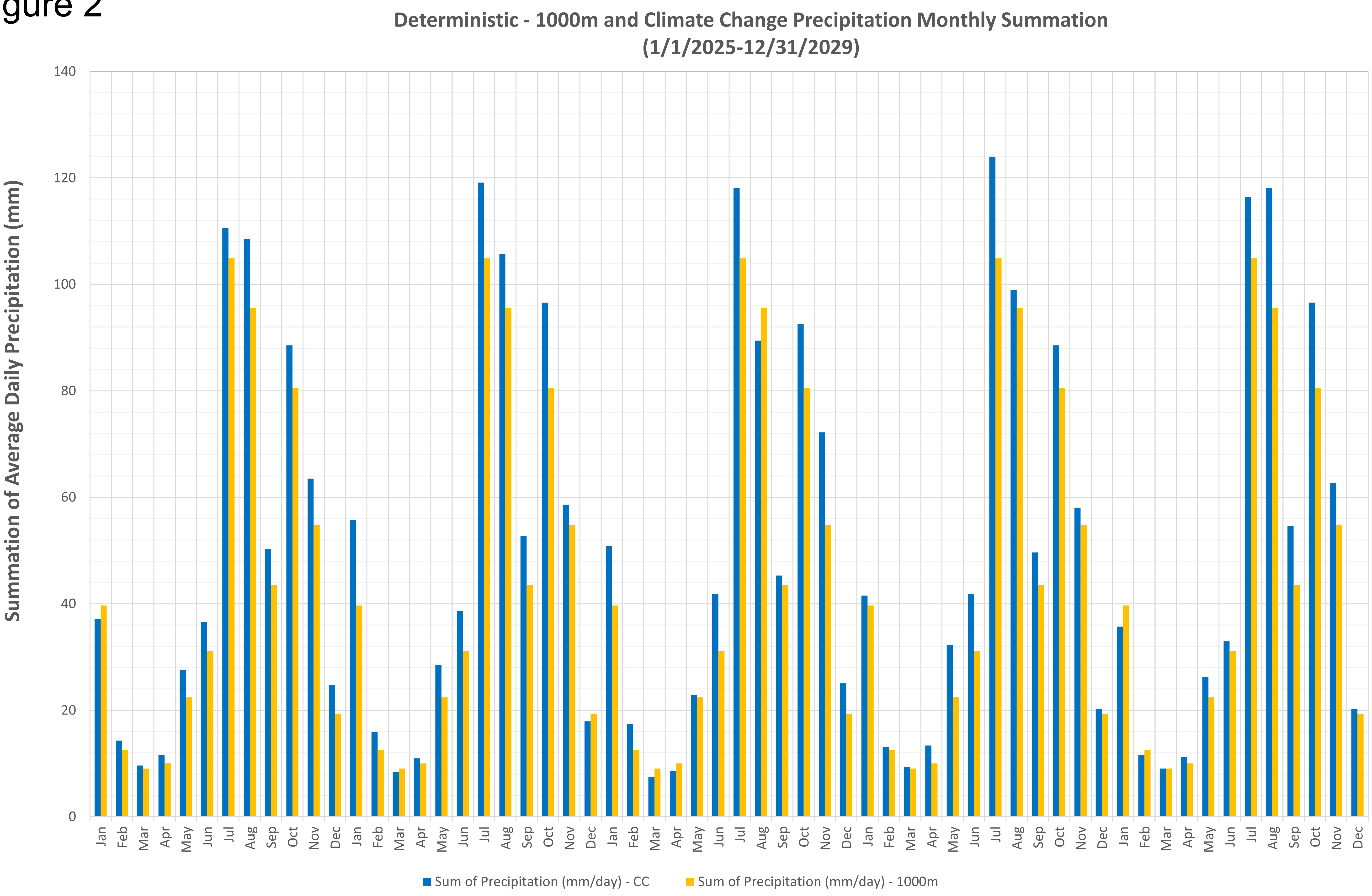

Deterministic - 1000m and Climate Change Precipitation Monthly Summation
(1/1/2025-12/31/2029)
Summation of Average Daily Precipitation (mm)
0
20
40
60
80
100
120
140
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Sum of Precipitation (mm/day) - CC
Sum of Precipitation (mm/day) - 1000m

Figure 3

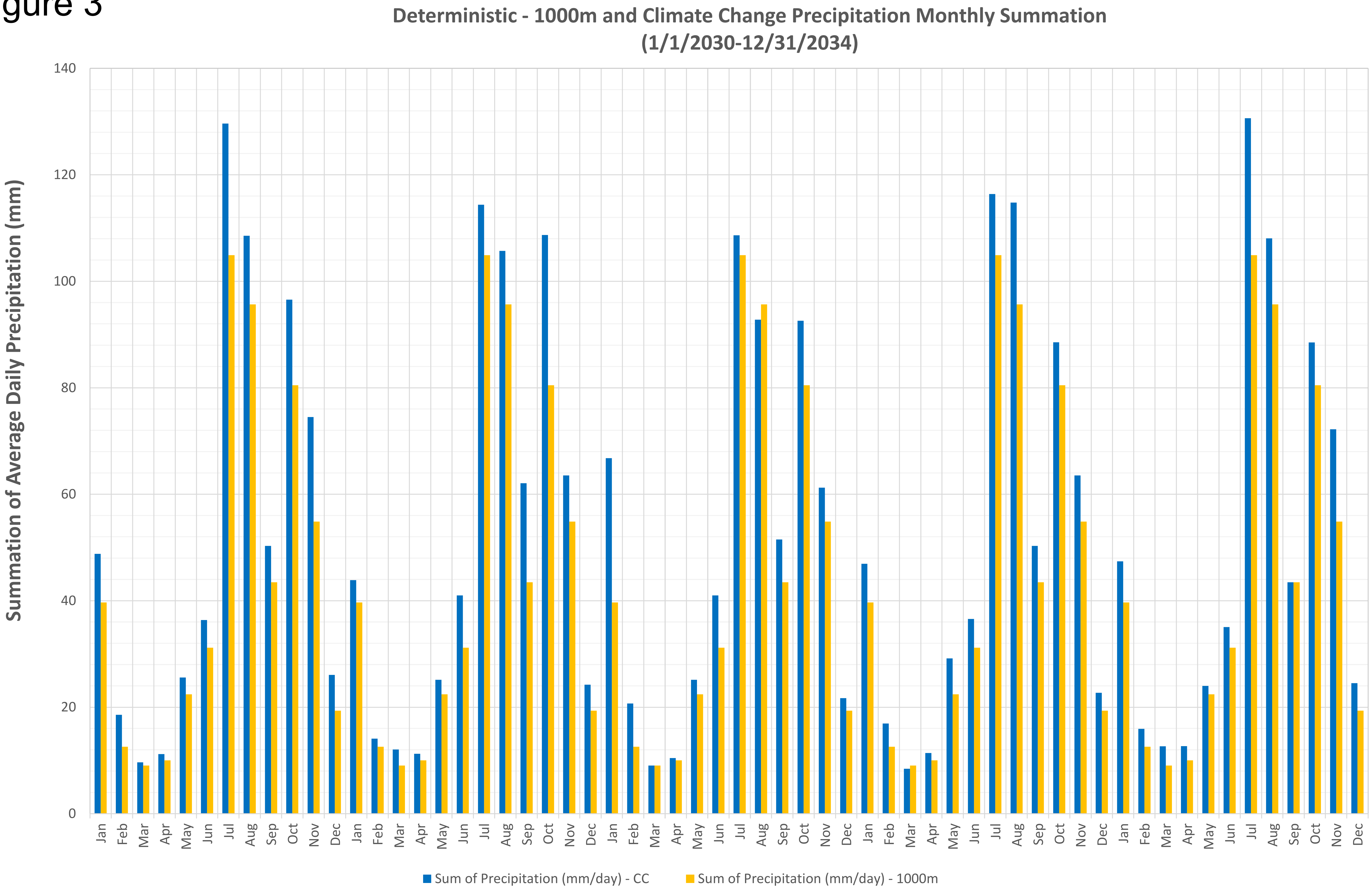

Deterministic - 1000m and Climate Change Precipitation Monthly Summation
(1/1/2030-12/31/2034)
Summation of Average Daily Precipitation (mm)
140
120
100
80
60
40
20
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
🟦 Sum of Precipitation (mm/day) - CC
🟨 Sum of Precipitation (mm/day) - 1000m

Figure 4

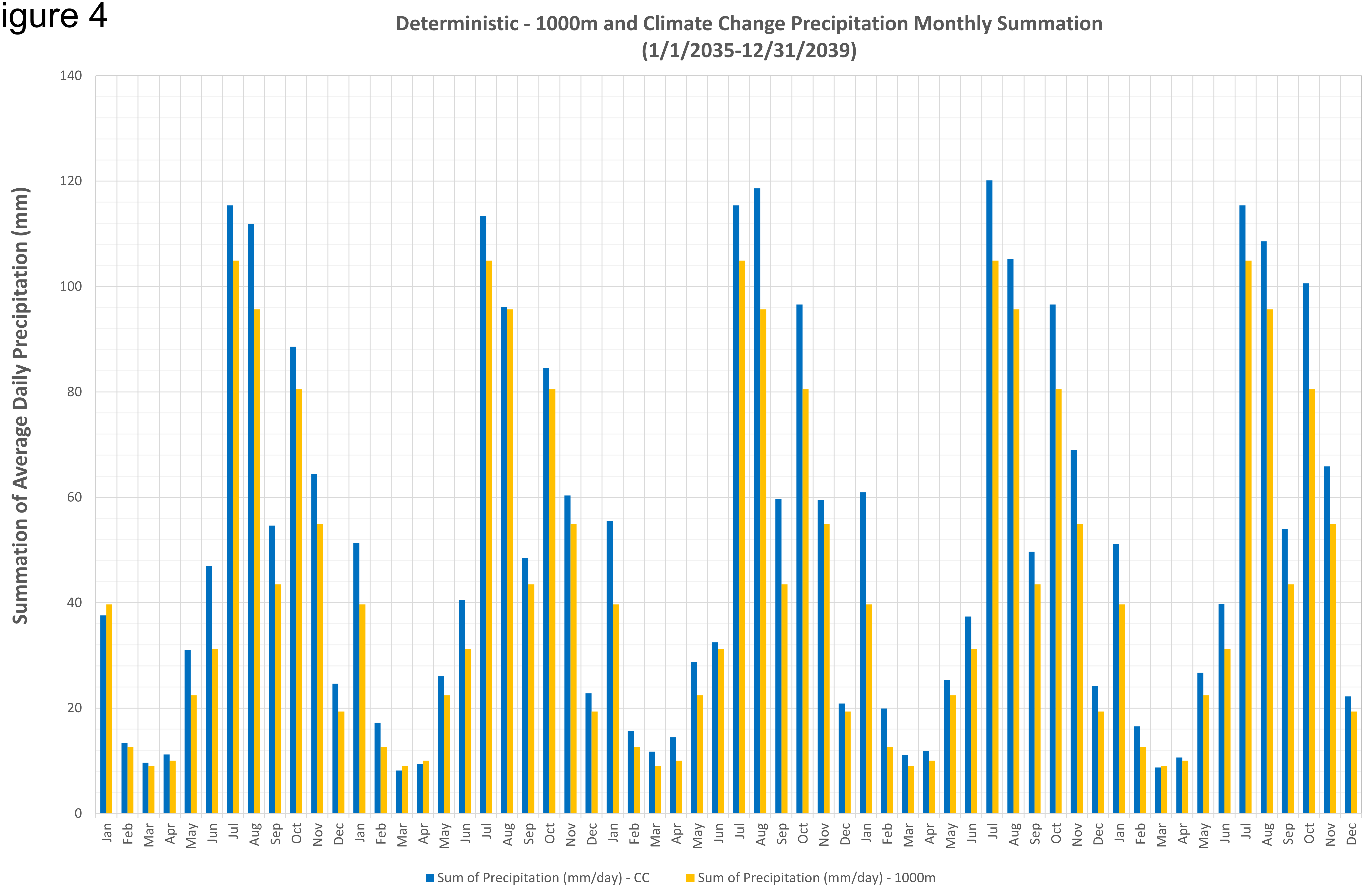
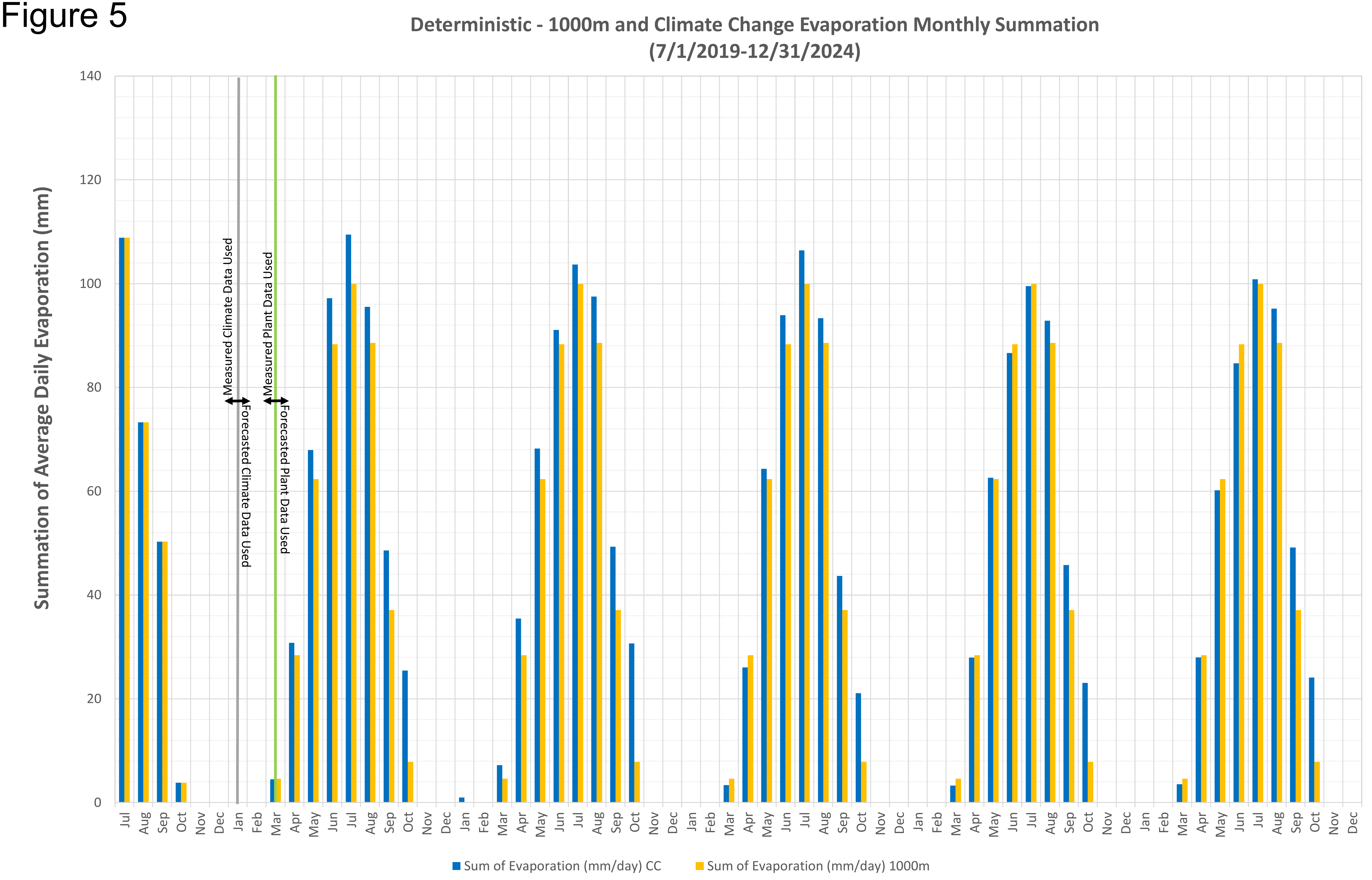

Deterministic - 1000m and Climate Change Precipitation Monthly Summation
(1/1/2035-12/31/2039)
Summation of Average Daily Precipitation (mm)
0
20
40
60
80
100
120
140
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sum of Precipitation (mm/day) - CC
Sum of Precipitation (mm/day) - 1000m

Figure 5


Deterministic - 1000m and Climate Change Evaporation Monthly Summation
(7/1/2019-12/31/2024)
Summation of Average Daily Evaporation (mm)
140
120
100
80
60
40
20
0
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
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Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sum of Evaporation (mm/day) CC
Sum of Evaporation (mm/day) 1000m

Figure 6

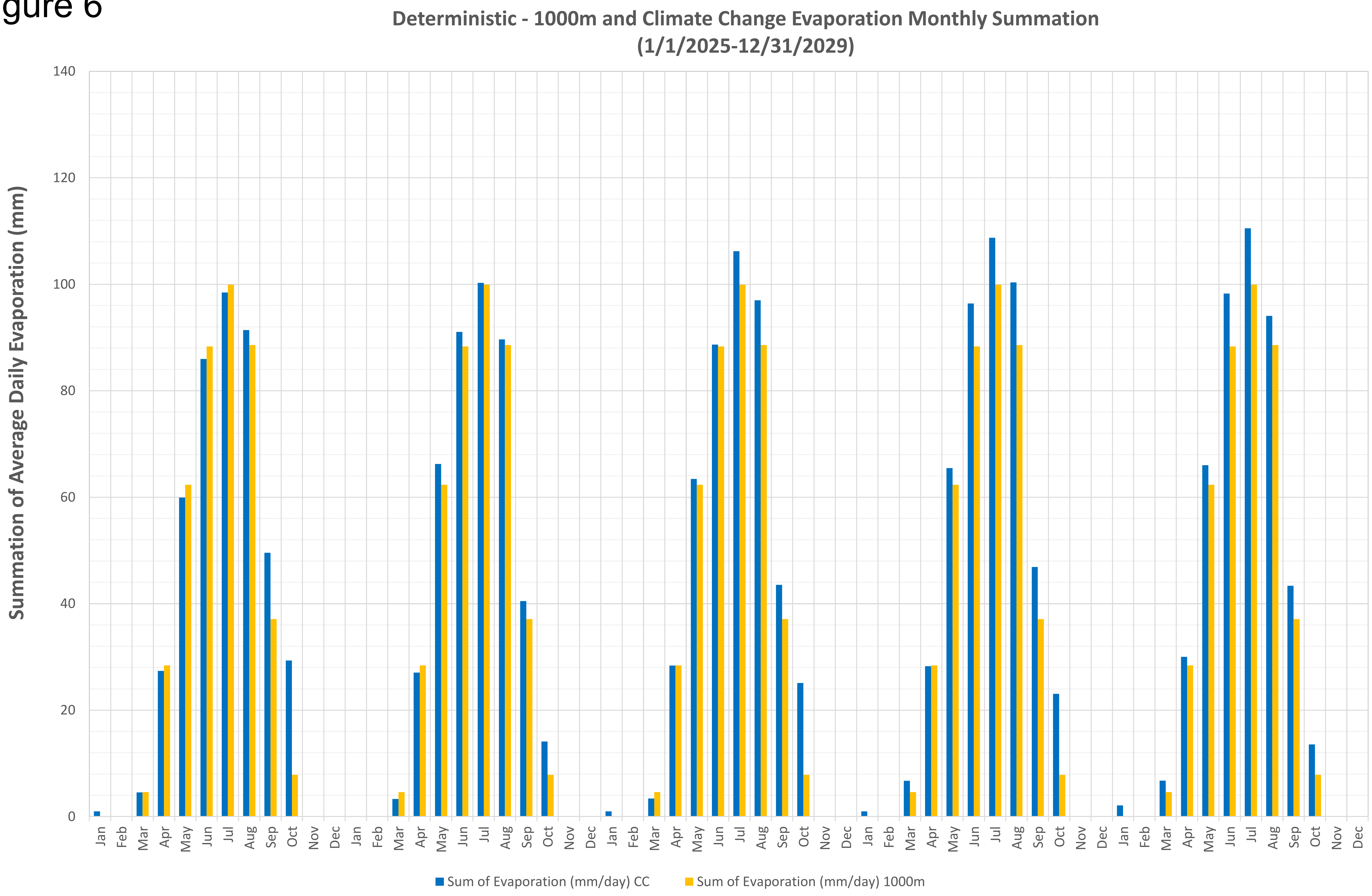

Deterministic - 1000m and Climate Change Evaporation Monthly Summation
(1/1/2025-12/31/2029)
Summation of Average Daily Evaporation (mm)
0
20
40
60
80
100
120
140
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sum of Evaporation (mm/day) CC
Sum of Evaporation (mm/day) 1000m

Figure 7

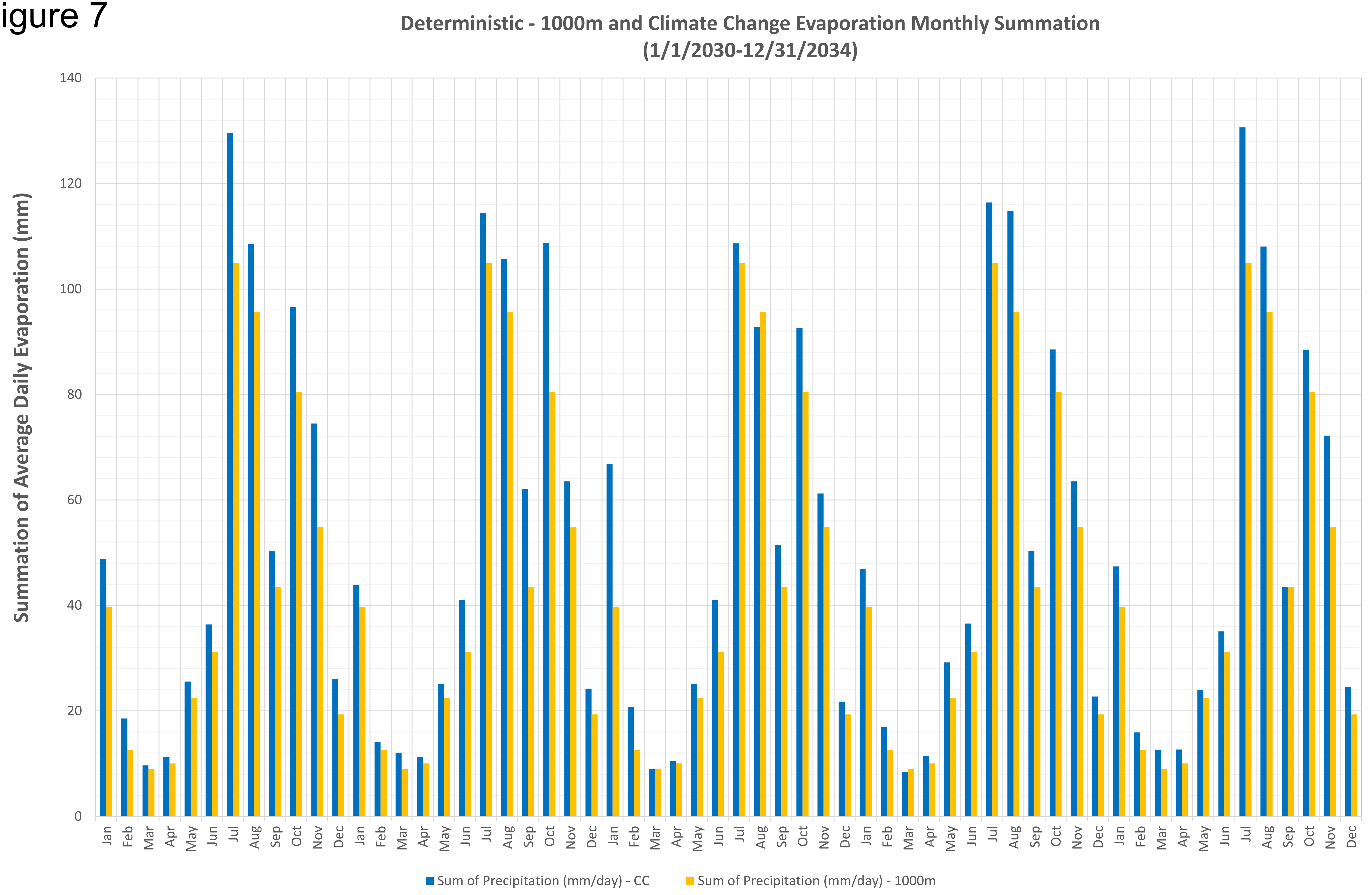

Deterministic - 1000m and Climate Change Evaporation Monthly Summation
(1/1/2030-12/31/2034)
Summation of Average Daily Evaporation (mm)
0
20
40
60
80
100
120
140
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
■ Sum of Precipitation (mm/day) - CC
■ Sum of Precipitation (mm/day) - 1000m

Figure 8

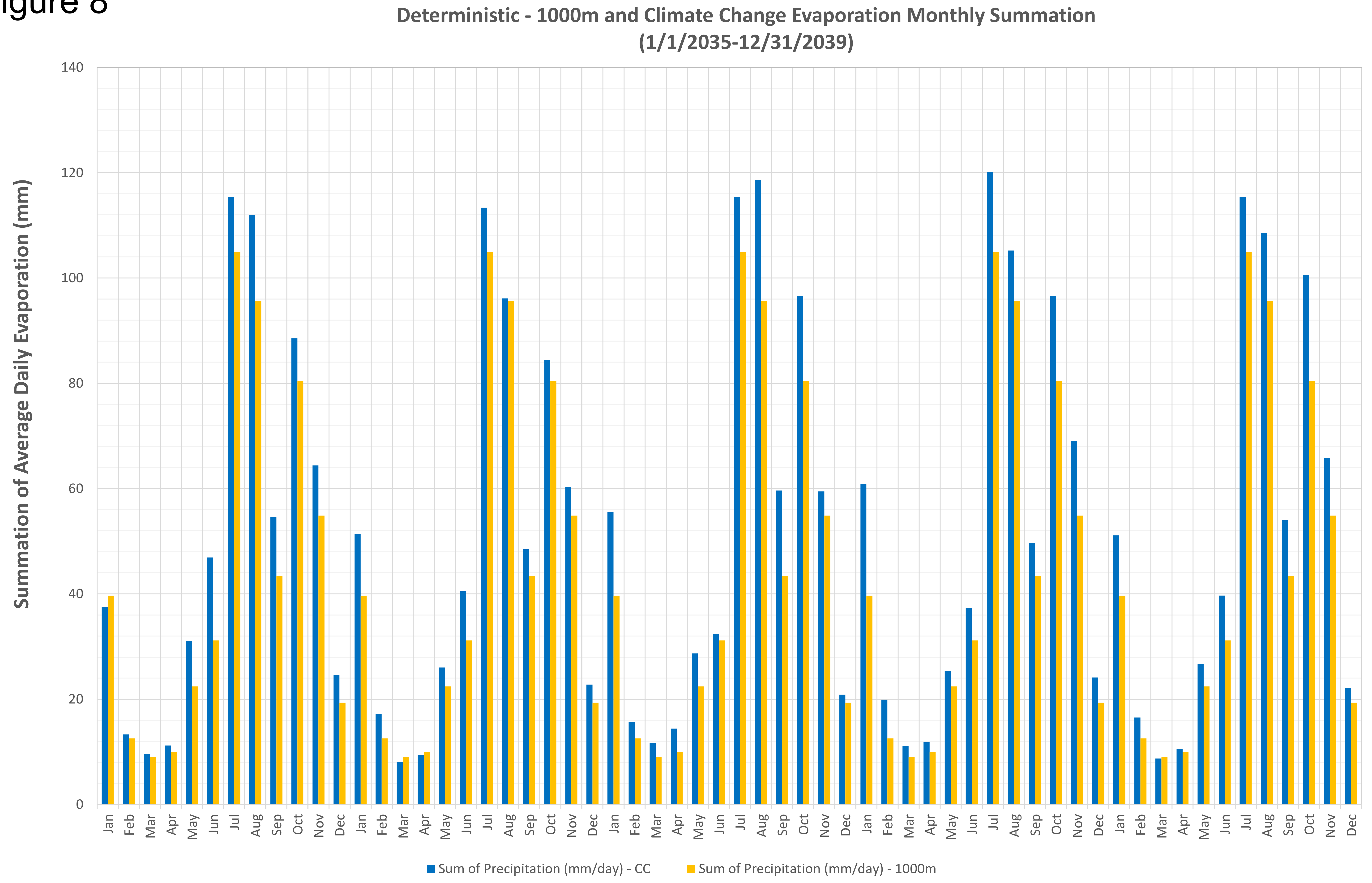

Deterministic - 1000m and Climate Change Evaporation Monthly Summation
(1/1/2035-12/31/2039)
Summation of Average Daily Evaporation (mm)
0
20
40
60
80
100
120
140
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sum of Precipitation (mm/day) - CC
Sum of Precipitation (mm/day) - 1000m

Figure 9

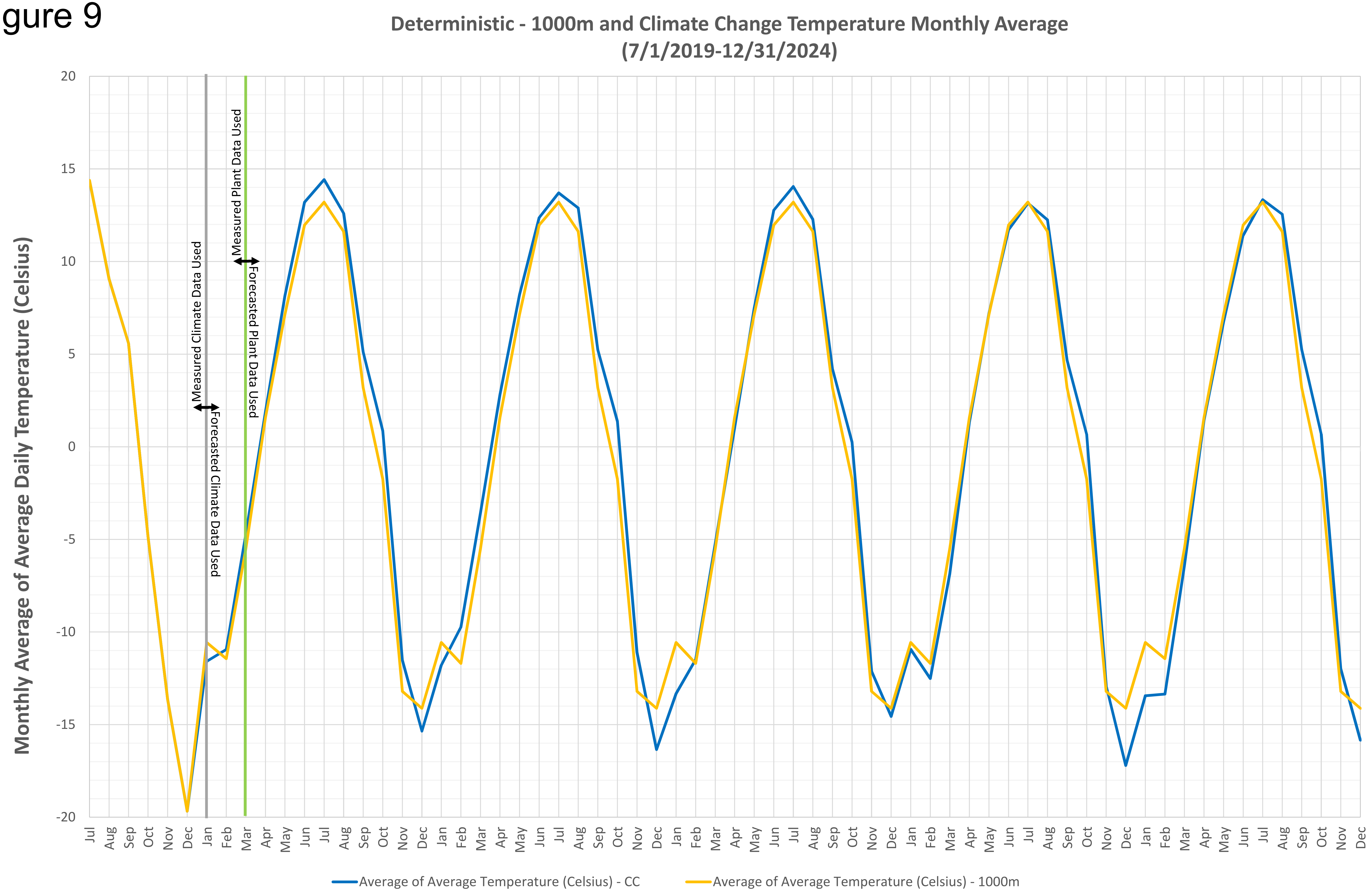
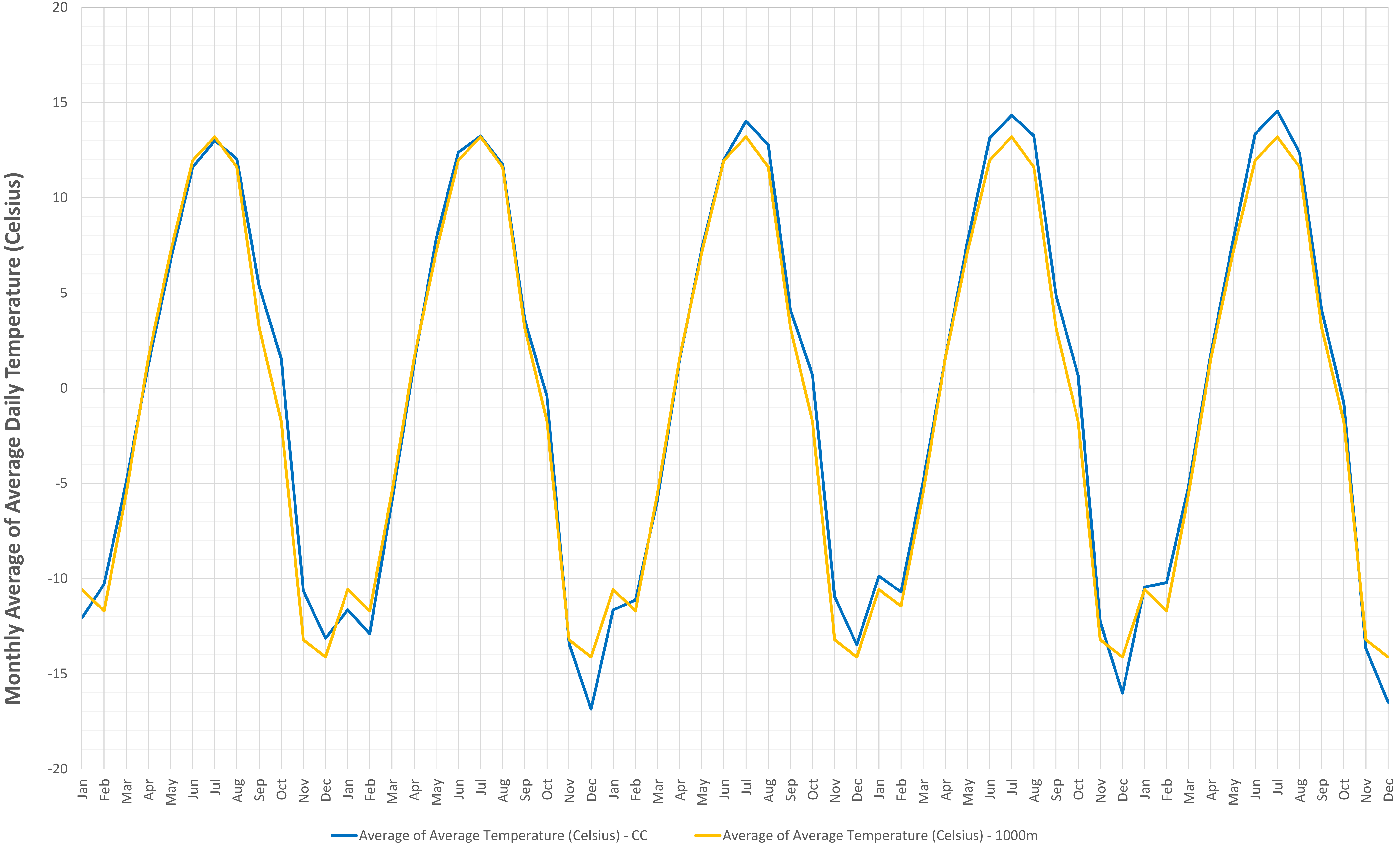

Deterministic - 1000m and Climate Change Temperature Monthly Average
(7/1/2019-12/31/2024)
Monthly Average of Average Daily Temperature (Celsius)
20
15
10
5
0
-5
-10
-15
-20
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Average of Average Temperature (Celsius) - CC
Average of Average Temperature (Celsius) - 1000m

Figure 10



Deterministic - 1000m and Climate Change Temperature Monthly Average
(1/1/2025-12/31/2029)

Figure 11

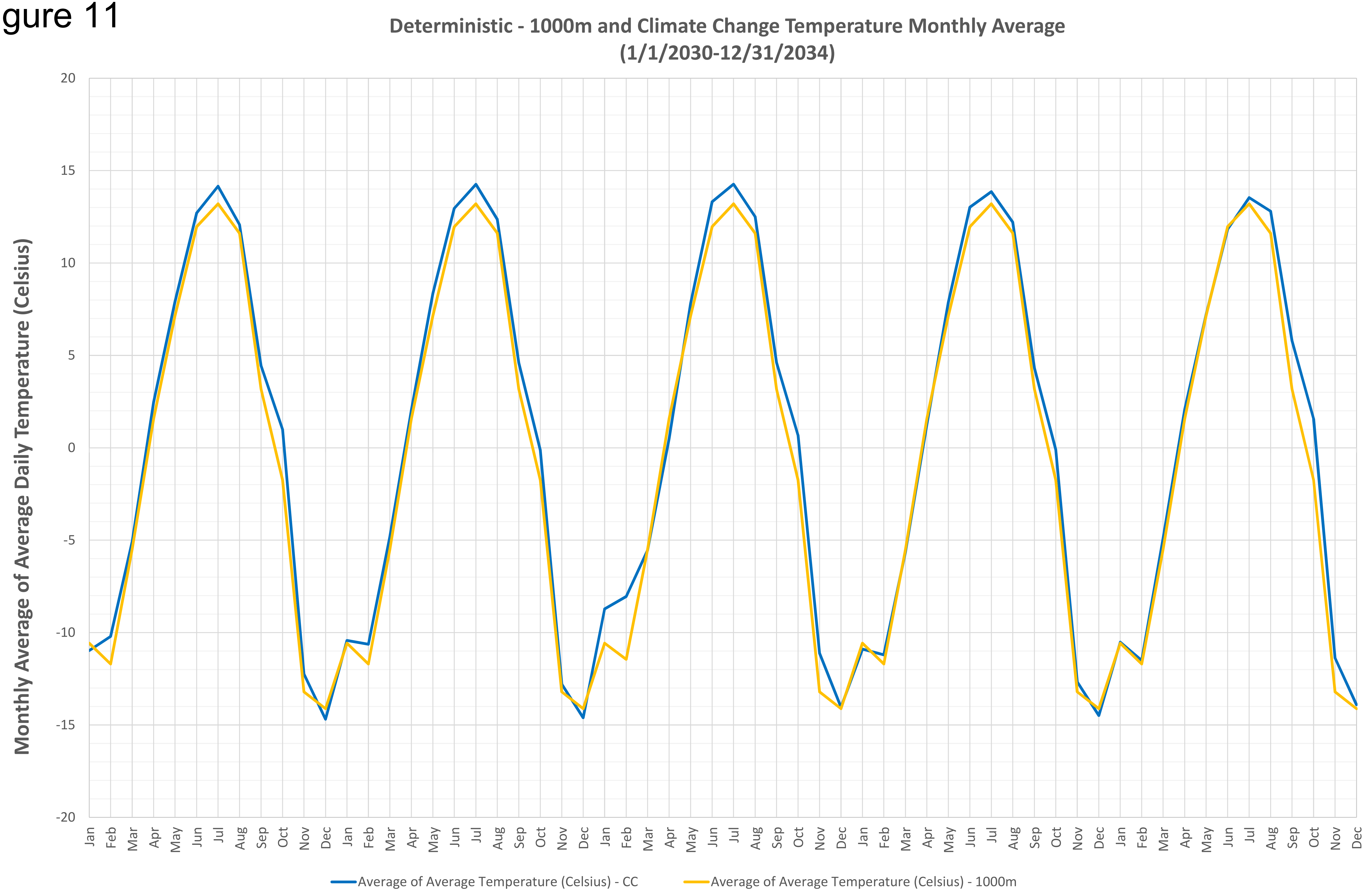

Deterministic - 1000m and Climate Change Temperature Monthly Average
(1/1/2030-12/31/2034)
Monthly Average of Average Daily Temperature (Celsius)
20
15
10
5
0
-5
-10
-15
-20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Average Temperature (Celsius) - CC
Average of Average Temperature (Celsius) - 1000m

Figure 12

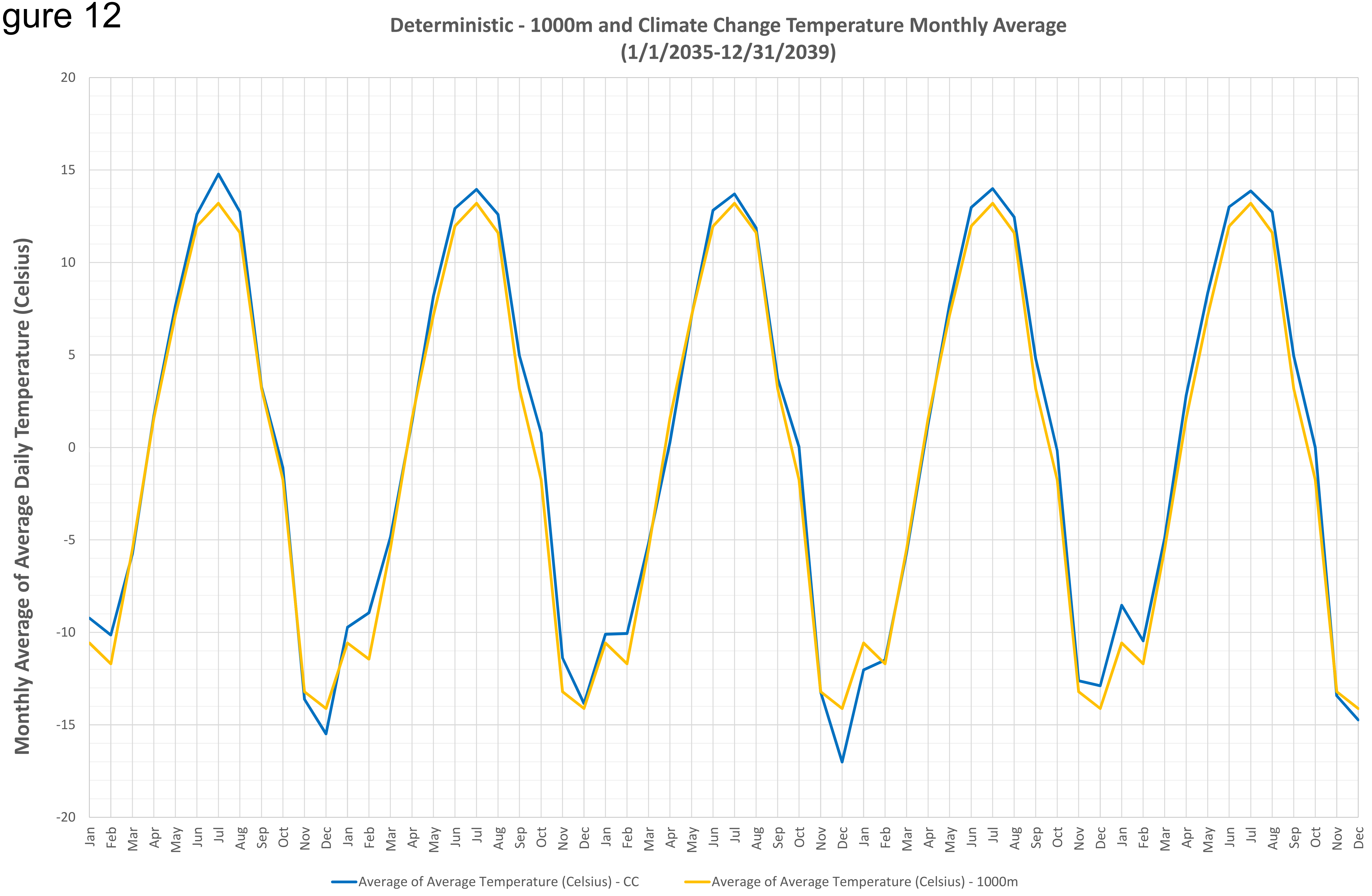

Deterministic - 1000m and Climate Change Temperature Monthly Average
(1/1/2035-12/31/2039)
Monthly Average of Average Daily Temperature (Celsius)
20
15
10
5
0
-5
-10
-15
-20
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Average of Average Temperature (Celsius) - CC
Average of Average Temperature (Celsius) - 1000m

Figure 13

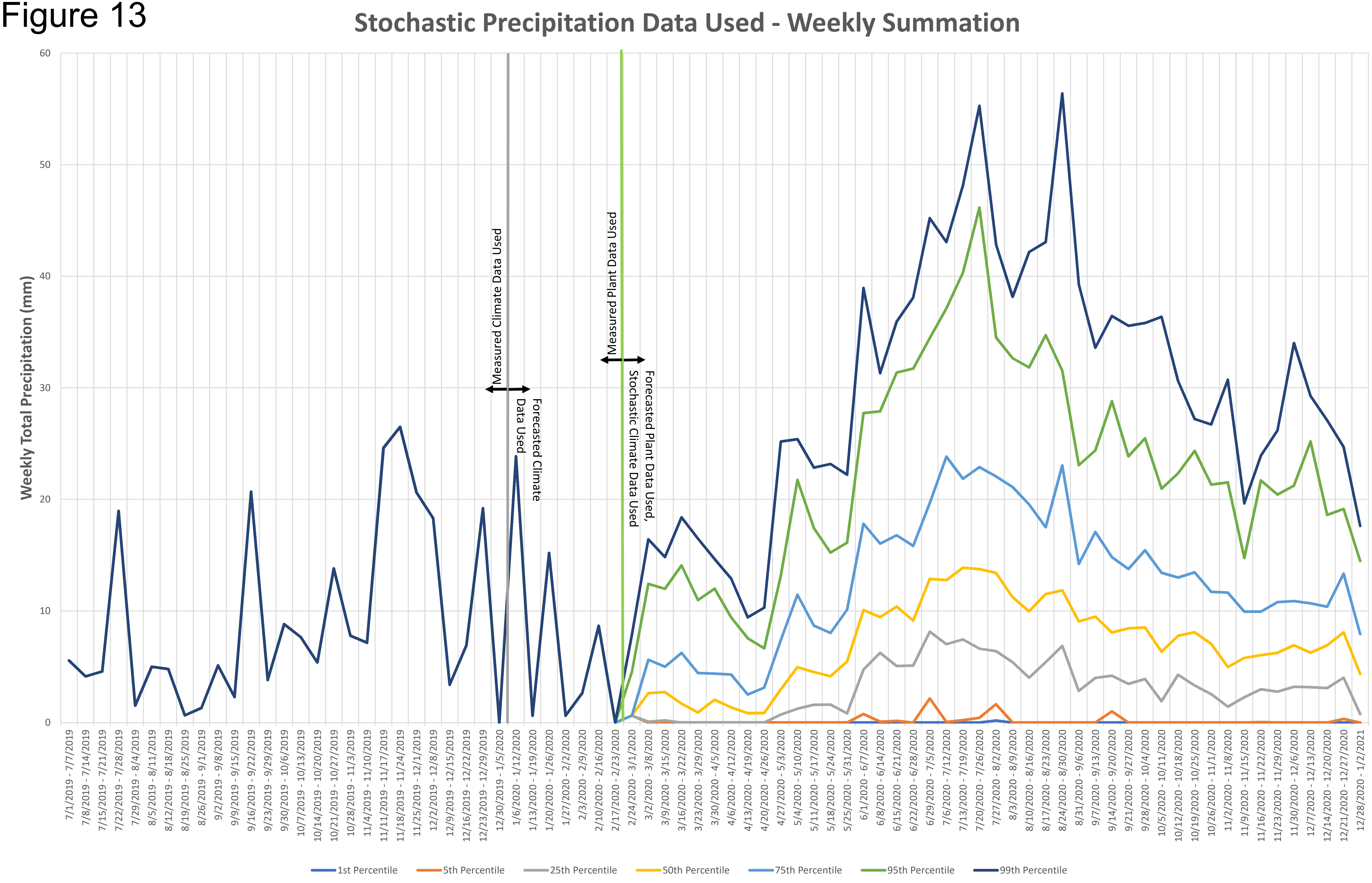

Stochastic Precipitation Data Used - Weekly Summation
Weekly Total Precipitation (mm)
0
10
20
30
40
50
60
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used, Stochastic Climate Data Used
7/1/2019 - 7/7/2019
7/8/2019 - 7/14/2019
7/15/2019 - 7/21/2019
7/22/2019 - 7/28/2019
7/29/2019 - 8/4/2019
8/5/2019 - 8/11/2019
8/12/2019 - 8/18/2019
8/19/2019 - 8/25/2019
8/26/2019 - 9/1/2019
9/2/2019 - 9/8/2019
9/9/2019 - 9/15/2019
9/16/2019 - 9/22/2019
9/23/2019 - 9/29/2019
9/30/2019 - 10/6/2019
10/7/2019 - 10/13/2019
10/14/2019 - 10/20/2019
10/21/2019 - 10/27/2019
10/28/2019 - 11/3/2019
11/4/2019 - 11/10/2019
11/11/2019 - 11/17/2019
11/18/2019 - 11/24/2019
11/25/2019 - 12/1/2019
12/2/2019 - 12/8/2019
12/9/2019 - 12/15/2019
12/16/2019 - 12/22/2019
12/23/2019 - 12/29/2019
12/30/2019 - 1/5/2020
1/6/2020 - 1/12/2020
1/13/2020 - 1/19/2020
1/20/2020 - 1/26/2020
1/27/2020 - 2/2/2020
2/3/2020 - 2/9/2020
2/10/2020 - 2/16/2020
2/17/2020 - 2/23/2020
2/24/2020 - 3/1/2020
3/2/2020 - 3/8/2020
3/9/2020 - 3/15/2020
3/16/2020 - 3/22/2020
3/23/2020 - 3/29/2020
3/30/2020 - 4/5/2020
4/6/2020 - 4/12/2020
4/13/2020 - 4/19/2020
4/20/2020 - 4/26/2020
4/27/2020 - 5/3/2020
5/4/2020 - 5/10/2020
5/11/2020 - 5/17/2020
5/18/2020 - 5/24/2020
5/25/2020 - 5/31/2020
6/1/2020 - 6/7/2020
6/8/2020 - 6/14/2020
6/15/2020 - 6/21/2020
6/22/2020 - 6/28/2020
6/29/2020 - 7/5/2020
7/6/2020 - 7/12/2020
7/13/2020 - 7/19/2020
7/20/2020 - 7/26/2020
7/27/2020 - 8/2/2020
8/3/2020 - 8/9/2020
8/10/2020 - 8/16/2020
8/17/2020 - 8/23/2020
8/24/2020 - 8/30/2020
8/31/2020 - 9/6/2020
9/7/2020 - 9/13/2020
9/14/2020 - 9/20/2020
9/21/2020 - 9/27/2020
9/28/2020 - 10/4/2020
10/5/2020 - 10/11/2020
10/12/2020 - 10/18/2020
10/19/2020 - 10/25/2020
10/26/2020 - 11/1/2020
11/2/2020 - 11/8/2020
11/9/2020 - 11/15/2020
11/16/2020 - 11/22/2020
11/23/2020 - 11/29/2020
11/30/2020 - 12/6/2020
12/7/2020 - 12/13/2020
12/14/2020 - 12/20/2020
12/21/2020 - 12/27/2020
12/28/2020 - 1/2/2021
1st Percentile
5th Percentile
25th Percentile
50th Percentile
75th Percentile
95th Percentile
99th Percentile

Figure 14

Stochastic Precipitation Data Used - Weekly Cumulative

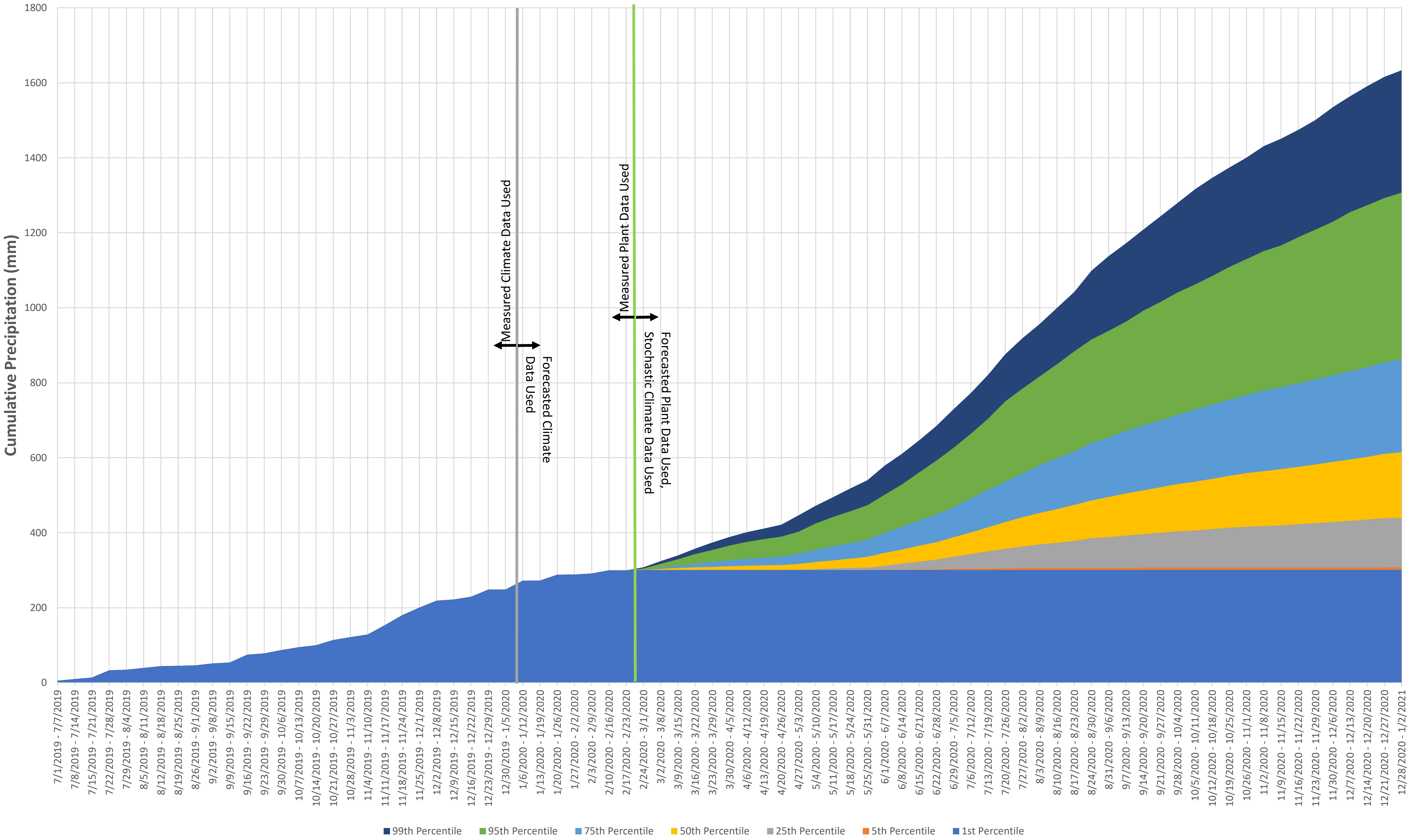


Figure 15

Stochastic Evaporation Data Used - Weekly Summation

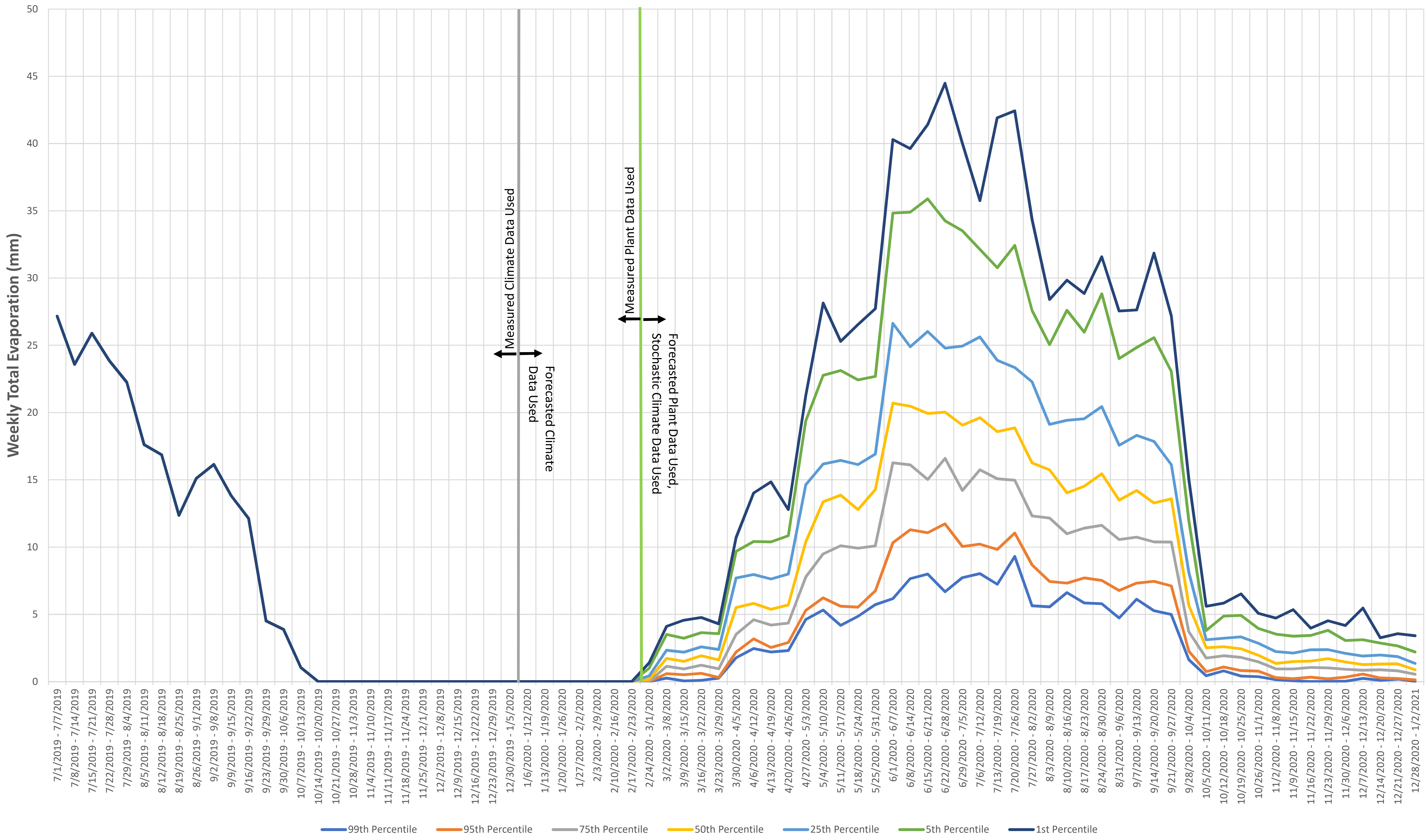


Figure 16

Stochastic Evaporation Data Used - Weekly Cumulative

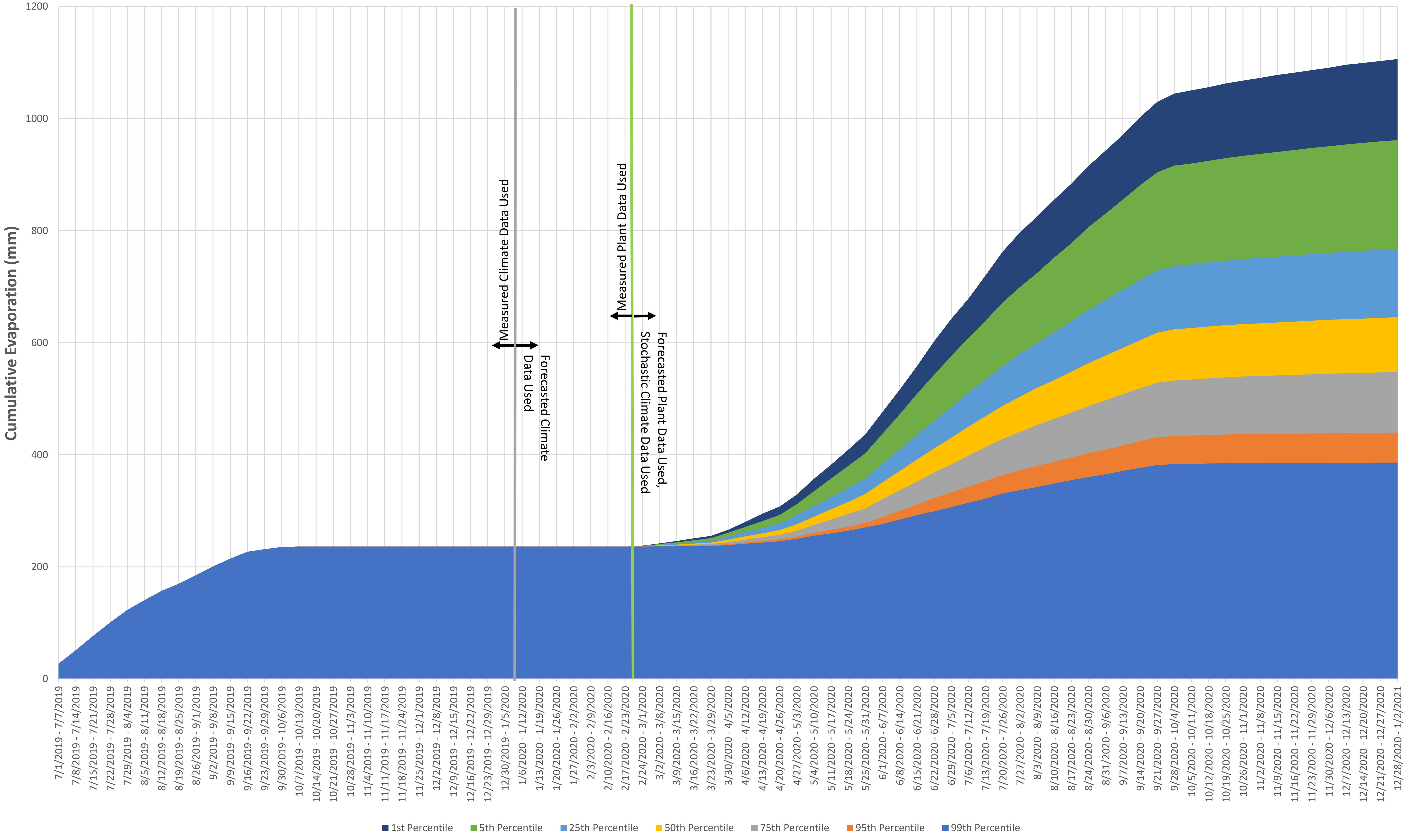
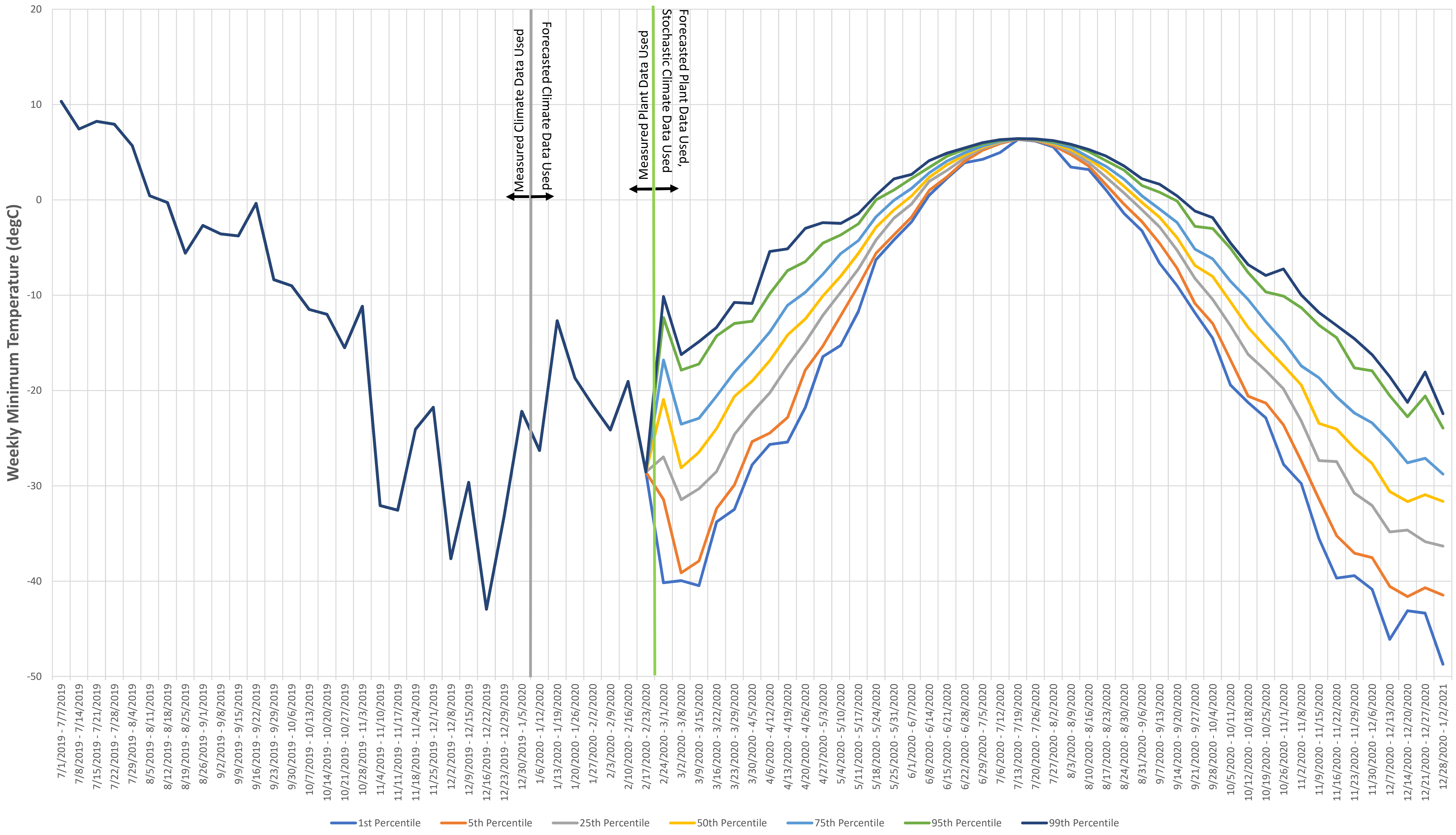


Figure 17



Stochastic Minimum Temperature Data Used - Weekly Minimum

Figure 18

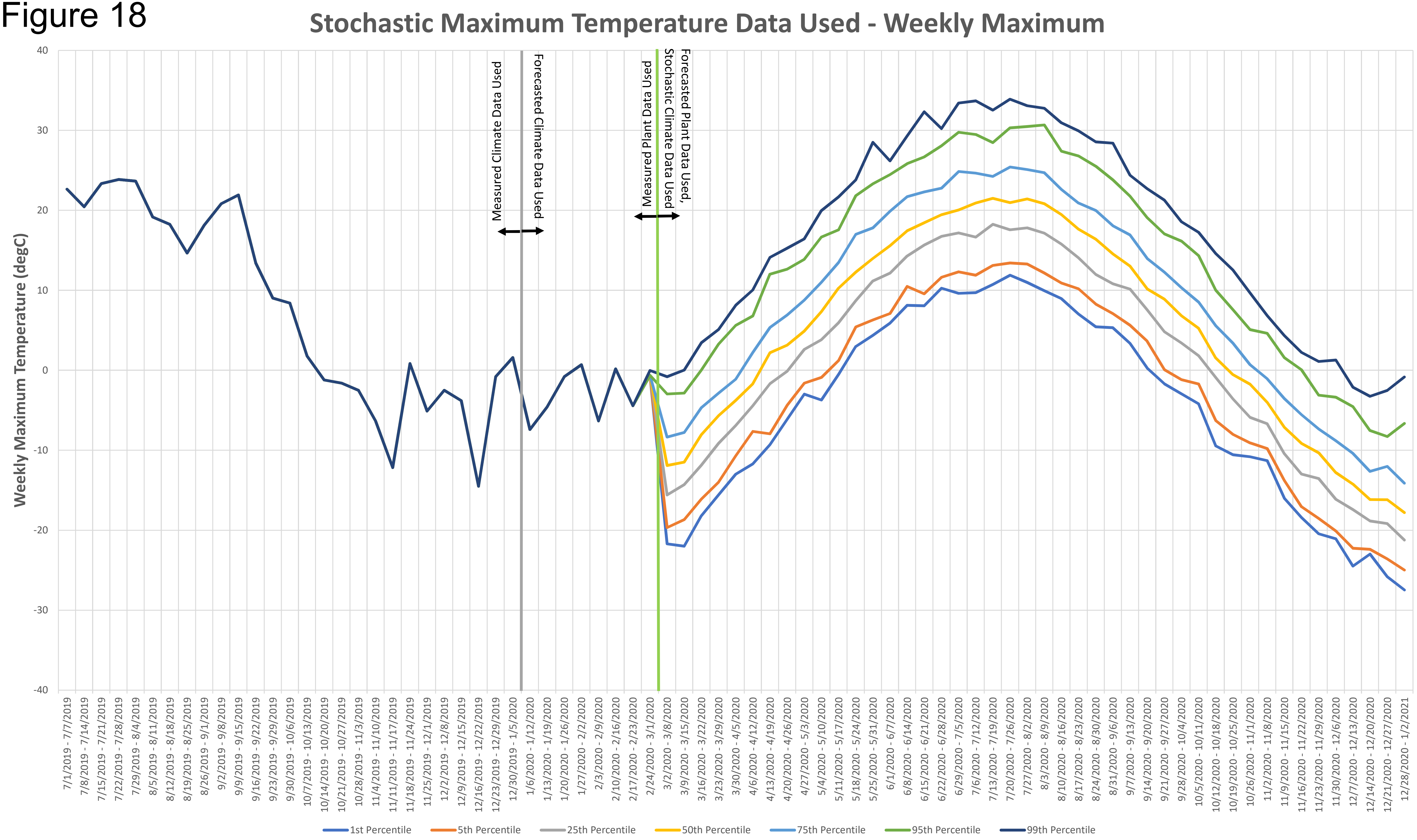

Stochastic Maximum Temperature Data Used - Weekly Maximum
Weekly Maximum Temperature (degC)
40
30
20
10
0
-10
-20
-30
-40
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used,
Stochastic Climate Data Used
7/1/2019 - 7/7/2019
7/8/2019 - 7/14/2019
7/15/2019 - 7/21/2019
7/22/2019 - 7/28/2019
7/29/2019 - 8/4/2019
8/5/2019 - 8/11/2019
8/12/2019 - 8/18/2019
8/19/2019 - 8/25/2019
8/26/2019 - 9/1/2019
9/2/2019 - 9/8/2019
9/9/2019 - 9/15/2019
9/16/2019 - 9/22/2019
9/23/2019 - 9/29/2019
9/30/2019 - 10/6/2019
10/7/2019 - 10/13/2019
10/14/2019 - 10/20/2019
10/21/2019 - 10/27/2019
10/28/2019 - 11/3/2019
11/4/2019 - 11/10/2019
11/11/2019 - 11/17/2019
11/18/2019 - 11/24/2019
11/25/2019 - 12/1/2019
12/2/2019 - 12/8/2019
12/9/2019 - 12/15/2019
12/16/2019 - 12/22/2019
12/23/2019 - 12/29/2019
12/30/2019 - 1/5/2020
1/6/2020 - 1/12/2020
1/13/2020 - 1/19/2020
1/20/2020 - 1/26/2020
1/27/2020 - 2/2/2020
2/3/2020 - 2/9/2020
2/10/2020 - 2/16/2020
2/17/2020 - 2/23/2020
2/24/2020 - 3/1/2020
3/2/2020 - 3/8/2020
3/9/2020 - 3/15/2020
3/16/2020 - 3/22/2020
3/23/2020 - 3/29/2020
3/30/2020 - 4/5/2020
4/6/2020 - 4/12/2020
4/13/2020 - 4/19/2020
4/20/2020 - 4/26/2020
4/27/2020 - 5/3/2020
5/4/2020 - 5/10/2020
5/11/2020 - 5/17/2020
5/18/2020 - 5/24/2020
5/25/2020 - 5/31/2020
6/1/2020 - 6/7/2020
6/8/2020 - 6/14/2020
6/15/2020 - 6/21/2020
6/22/2020 - 6/28/2020
6/29/2020 - 7/5/2020
7/6/2020 - 7/12/2020
7/13/2020 - 7/19/2020
7/20/2020 - 7/26/2020
7/27/2020 - 8/2/2020
8/3/2020 - 8/9/2020
8/10/2020 - 8/16/2020
8/17/2020 - 8/23/2020
8/24/2020 - 8/30/2020
8/31/2020 - 9/6/2020
9/7/2020 - 9/13/2020
9/14/2020 - 9/20/2020
9/21/2020 - 9/27/2020
9/28/2020 - 10/4/2020
10/5/2020 - 10/11/2020
10/12/2020 - 10/18/2020
10/19/2020 - 10/25/2020
10/26/2020 - 11/1/2020
11/2/2020 - 11/8/2020
11/9/2020 - 11/15/2020
11/16/2020 - 11/22/2020
11/23/2020 - 11/29/2020
11/30/2020 - 12/6/2020
12/7/2020 - 12/13/2020
12/14/2020 - 12/20/2020
12/21/2020 - 12/27/2020
12/28/2020 - 1/2/2021
1st Percentile
5th Percentile
25th Percentile
50th Percentile
75th Percentile
95th Percentile
99th Percentile

Figure 19

Stochastic Solar Radiation Data Used - Weekly Average

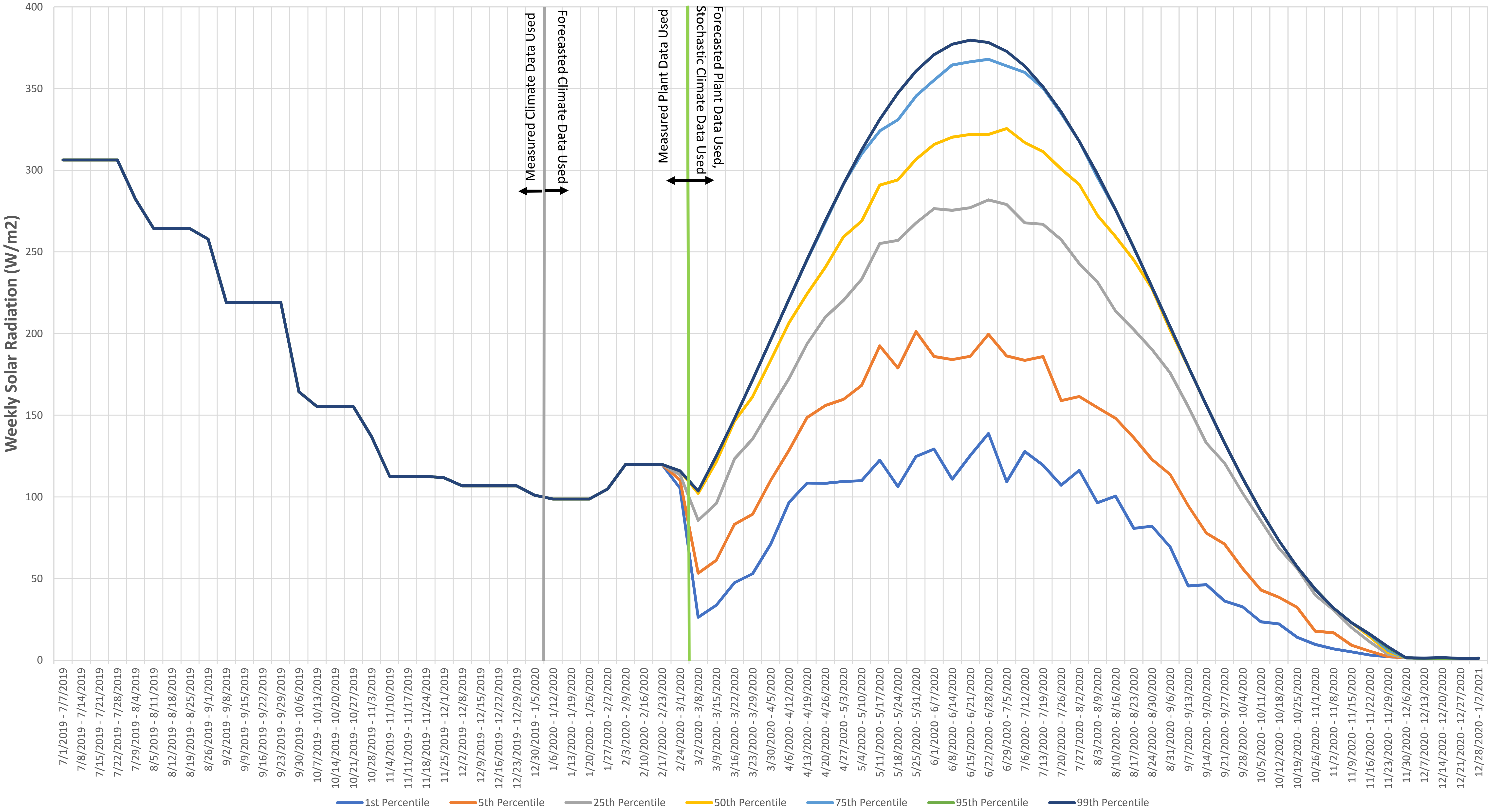


Figure 20

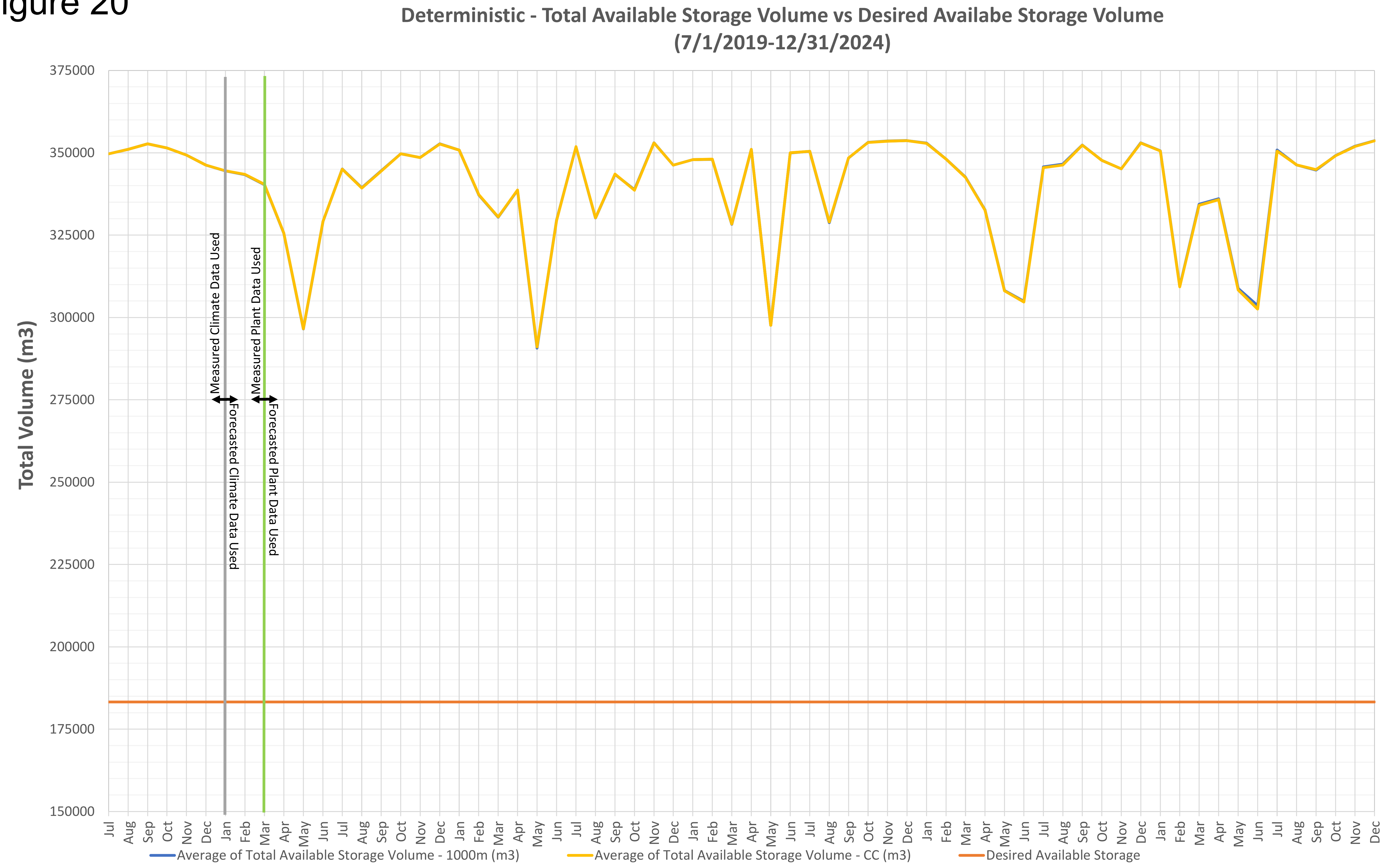

Deterministic - Total Available Storage Volume vs Desired Availabe Storage Volume
(7/1/2019-12/31/2024)
Total Volume (m3)
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Average of Total Available Storage Volume - 1000m (m3)
Average of Total Available Storage Volume - CC (m3)
Desired Available Storage

Figure 21

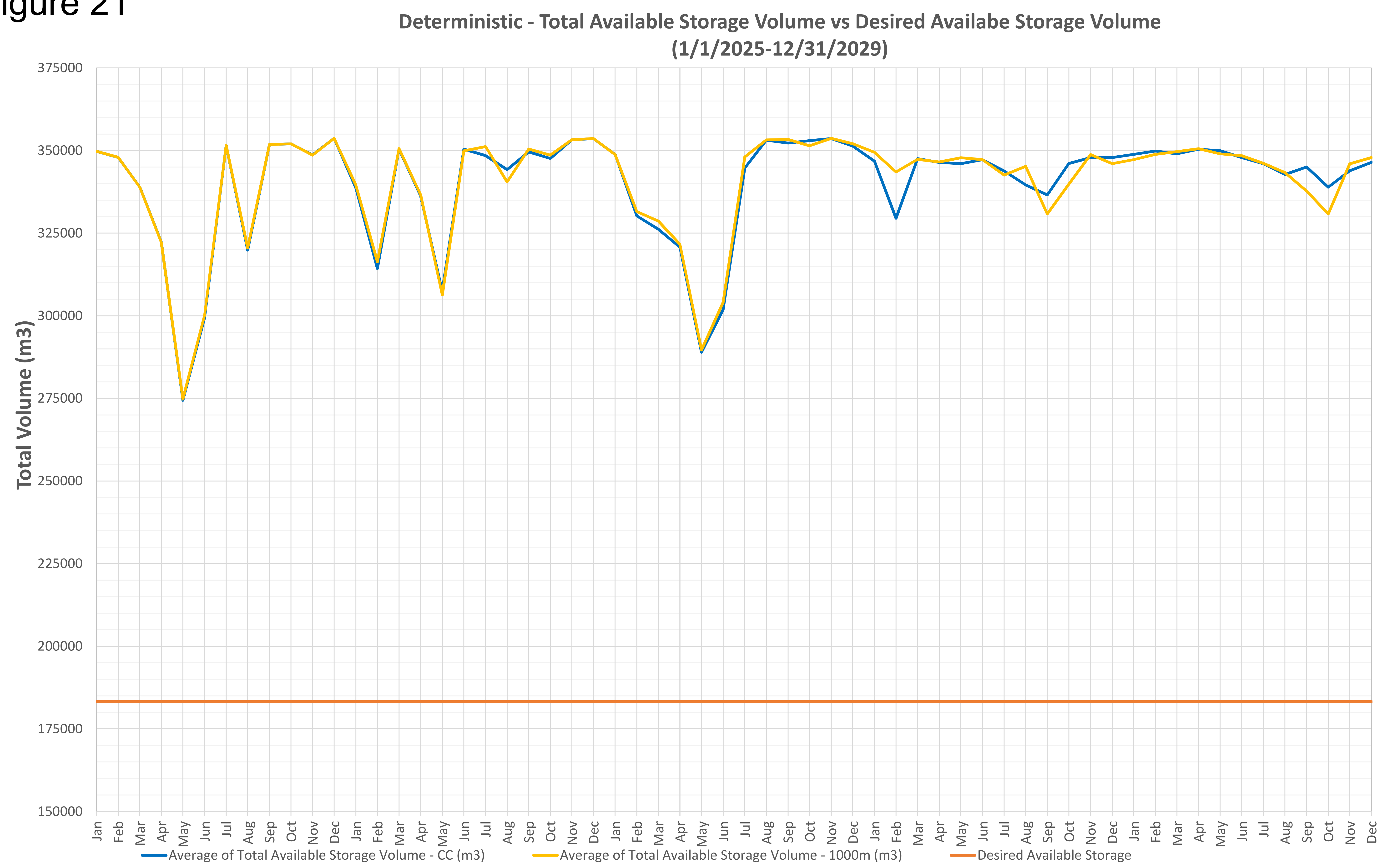
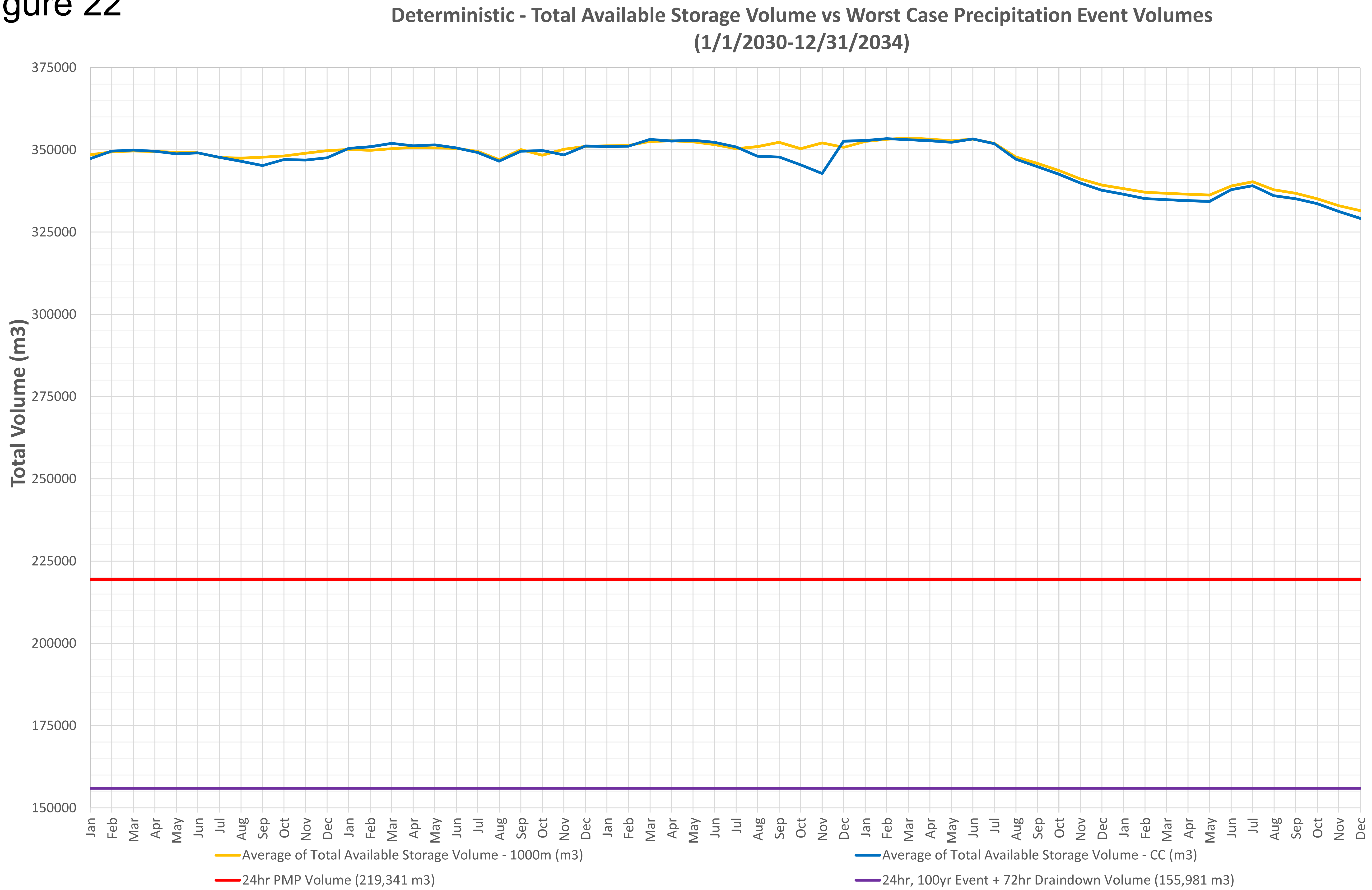
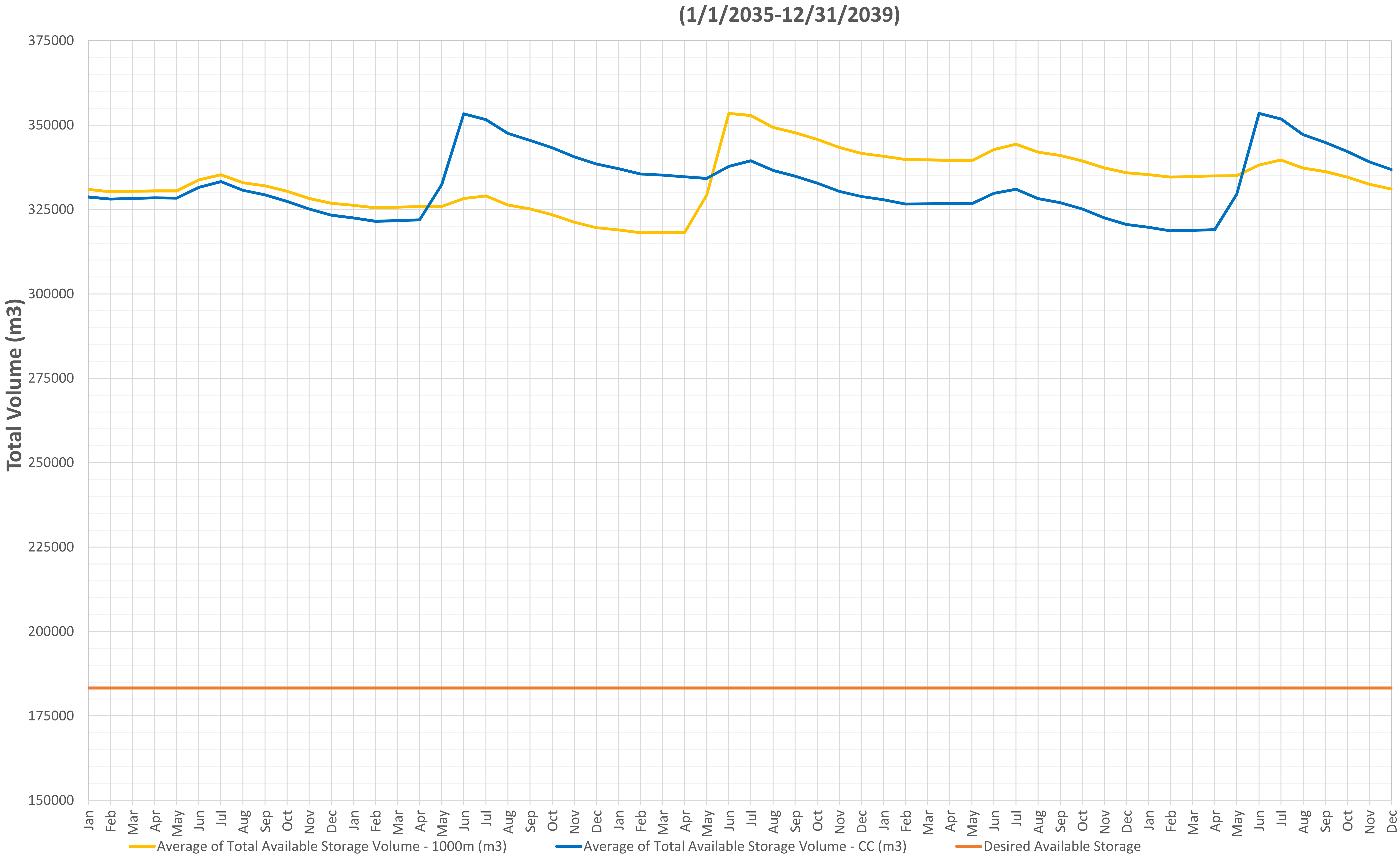

Deterministic - Total Available Storage Volume vs Desired Availabe Storage Volume
(1/1/2025-12/31/2029)
Total Volume (m3)
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Average of Total Available Storage Volume - CC (m3)
Average of Total Available Storage Volume - 1000m (m3)
Desired Available Storage

Figure 22



Deterministic - Total Available Storage Volume vs Worst Case Precipitation Event Volumes (1/1/2030-12/31/2034)

Figure 23



Deterministic - Total Available Storage Volume vs Desired Available Storage Volume (1/1/2035-12/31/2039)

Figure 24

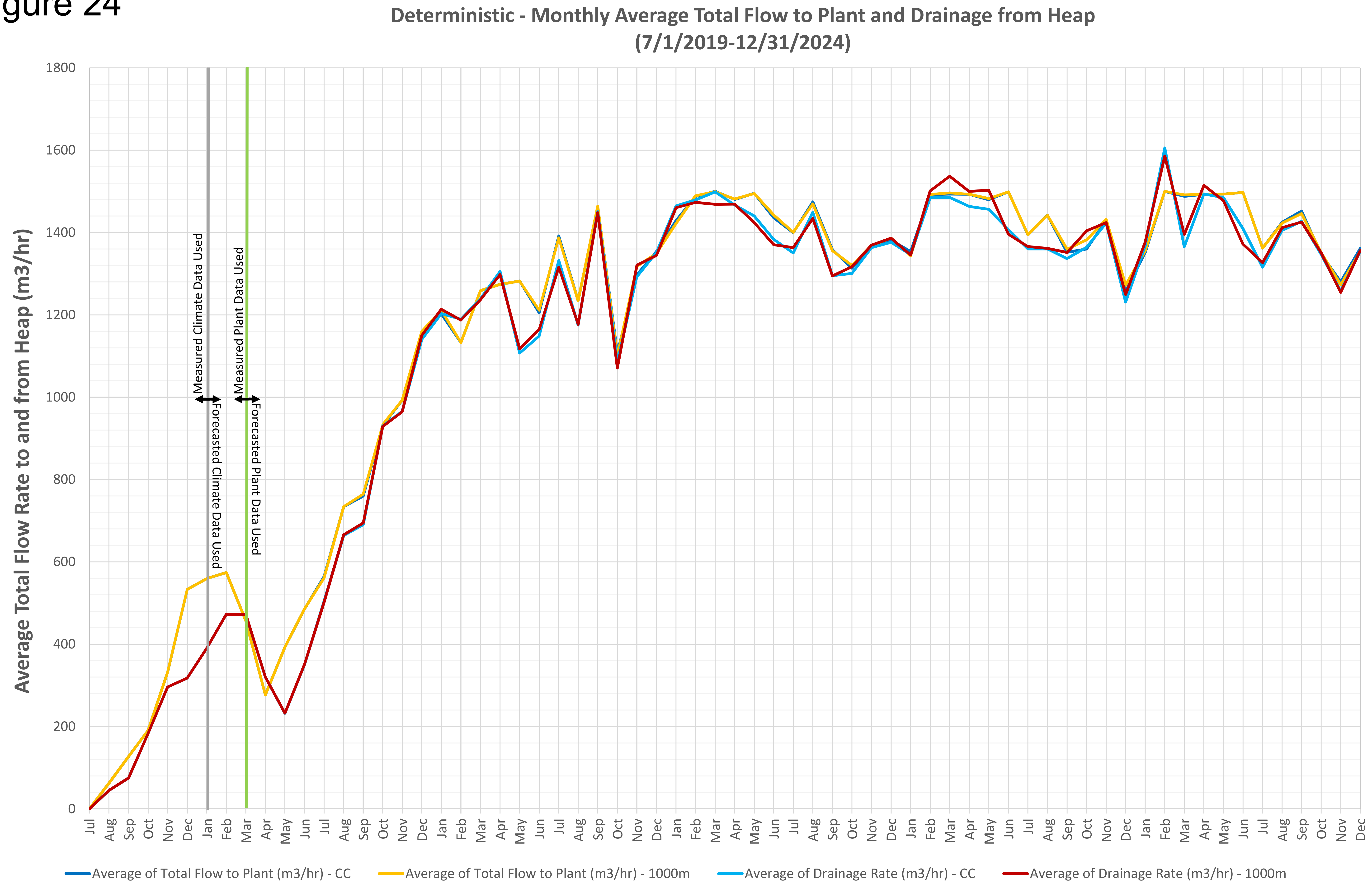

Deterministic - Monthly Average Total Flow to Plant and Drainage from Heap
(7/1/2019-12/31/2024)
Average Total Flow Rate to and from Heap (m3/hr)
1800
1600
1400
1200
1000
800
600
400
200
0
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Average of Total Flow to Plant (m3/hr) - CC
Average of Total Flow to Plant (m3/hr) - 1000m
Average of Drainage Rate (m3/hr) - CC
Average of Drainage Rate (m3/hr) - 1000m

Figure 25

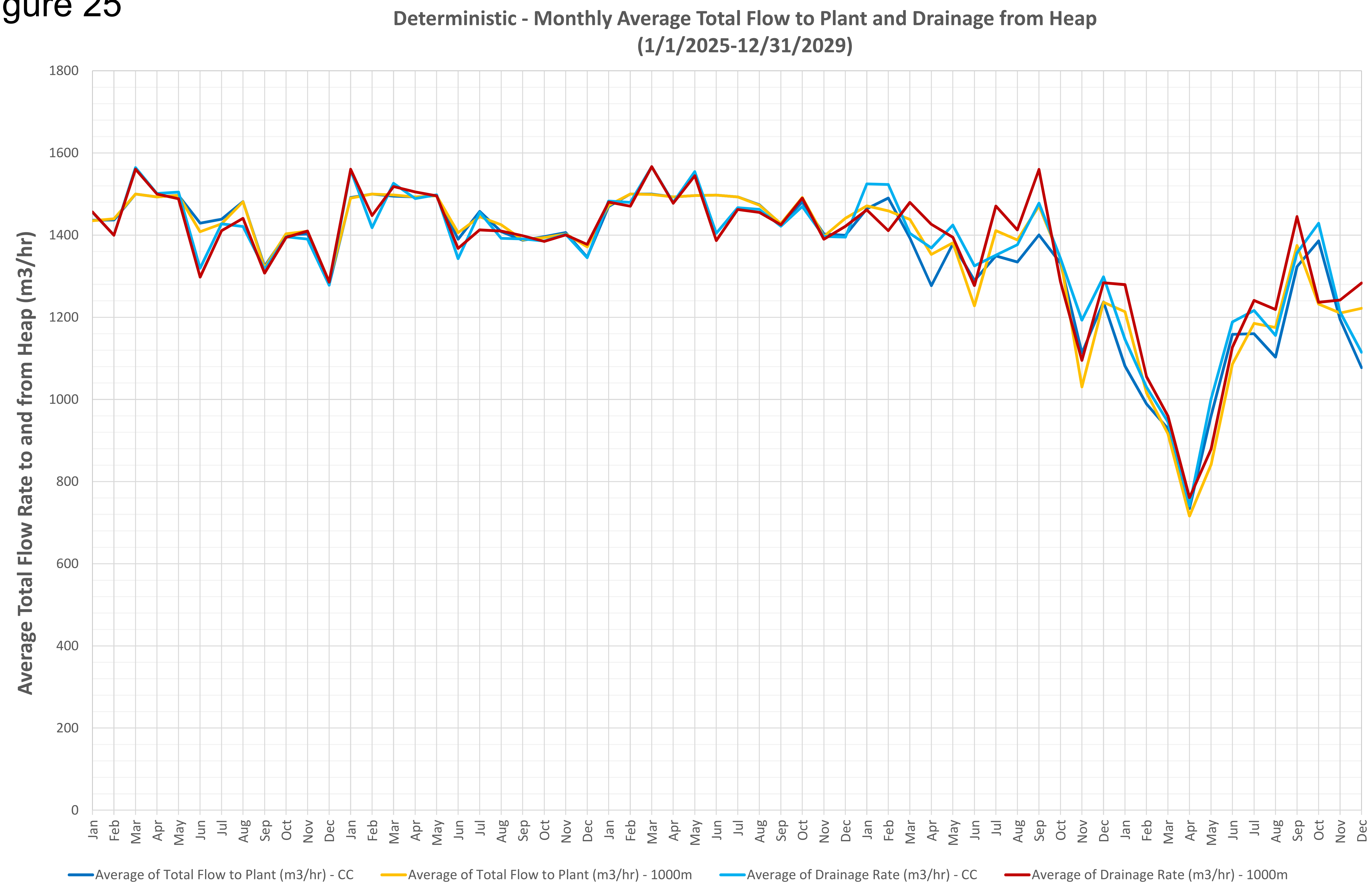
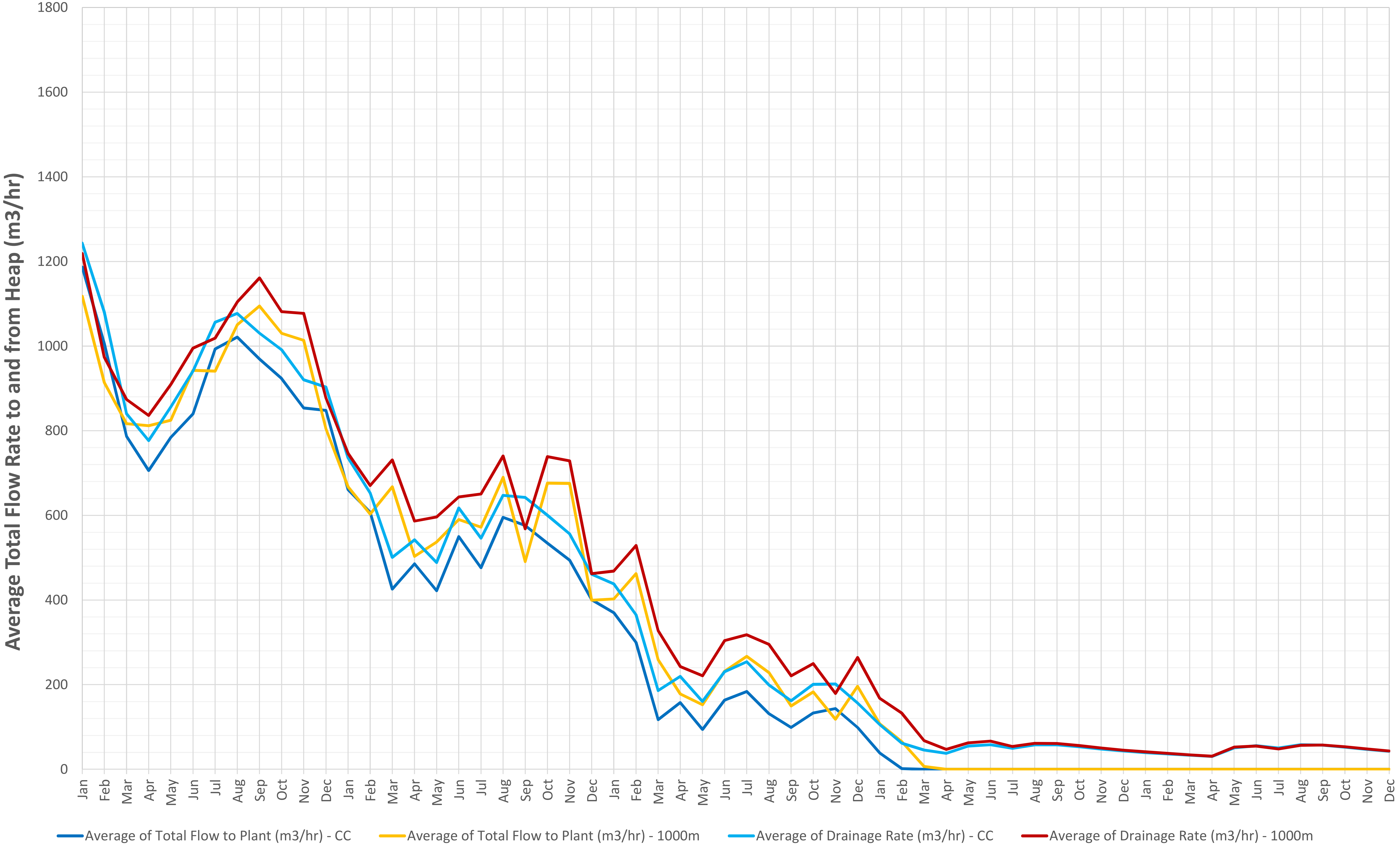

Deterministic - Monthly Average Total Flow to Plant and Drainage from Heap
(1/1/2025-12/31/2029)
Average Total Flow Rate to and from Heap (m3/hr)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Total Flow to Plant (m3/hr) - CC
Average of Total Flow to Plant (m3/hr) - 1000m
Average of Drainage Rate (m3/hr) - CC
Average of Drainage Rate (m3/hr) - 1000m

Figure 26



Deterministic - Monthly Average Total Flow to Plant and Drainage from Heap
(1/1/2030-12/31/2034)

Figure 27

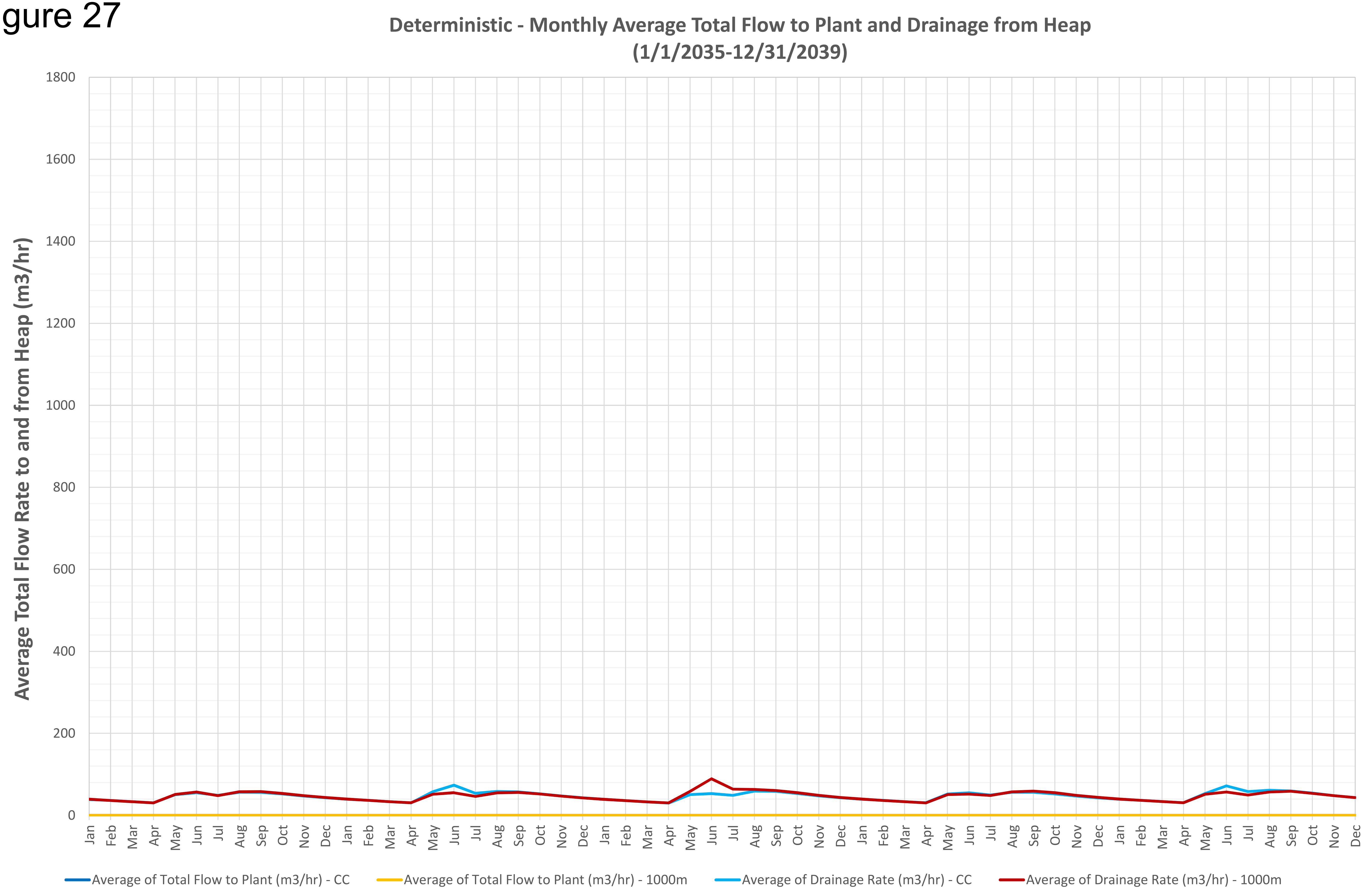
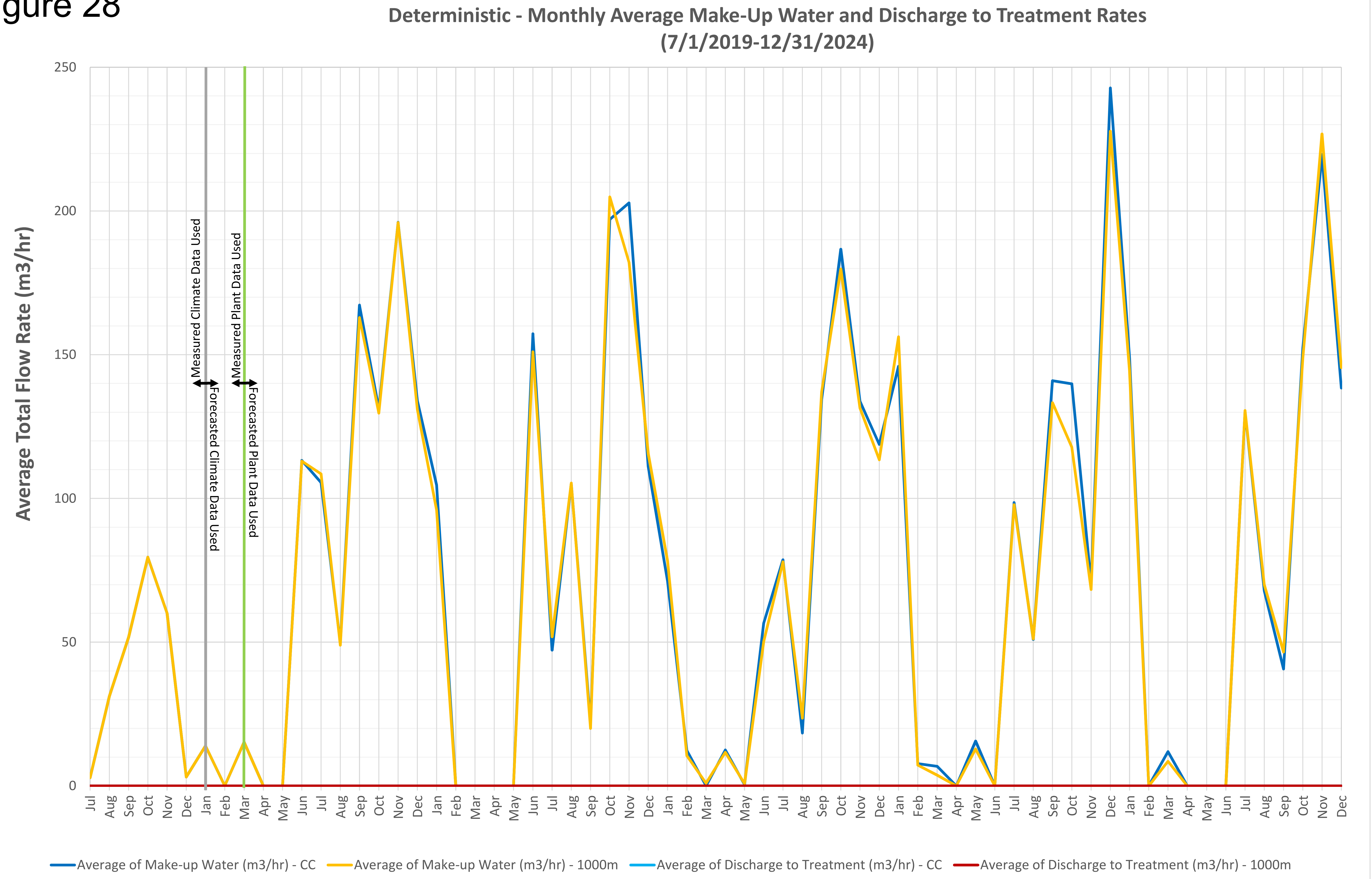

Deterministic - Monthly Average Total Flow to Plant and Drainage from Heap
(1/1/2035-12/31/2039)
Average Total Flow Rate to and from Heap (m3/hr)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Total Flow to Plant (m3/hr) - CC
Average of Total Flow to Plant (m3/hr) - 1000m
Average of Drainage Rate (m3/hr) - CC
Average of Drainage Rate (m3/hr) - 1000m

Figure 28



Deterministic - Monthly Average Make-Up Water and Discharge to Treatment Rates
(7/1/2019-12/31/2024)
Average Total Flow Rate (m3/hr)
250
200
150
100
50
0
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Average of Make-up Water (m3/hr) - CC
Average of Make-up Water (m3/hr) - 1000m
Average of Discharge to Treatment (m3/hr) - CC
Average of Discharge to Treatment (m3/hr) - 1000m

Figure 29

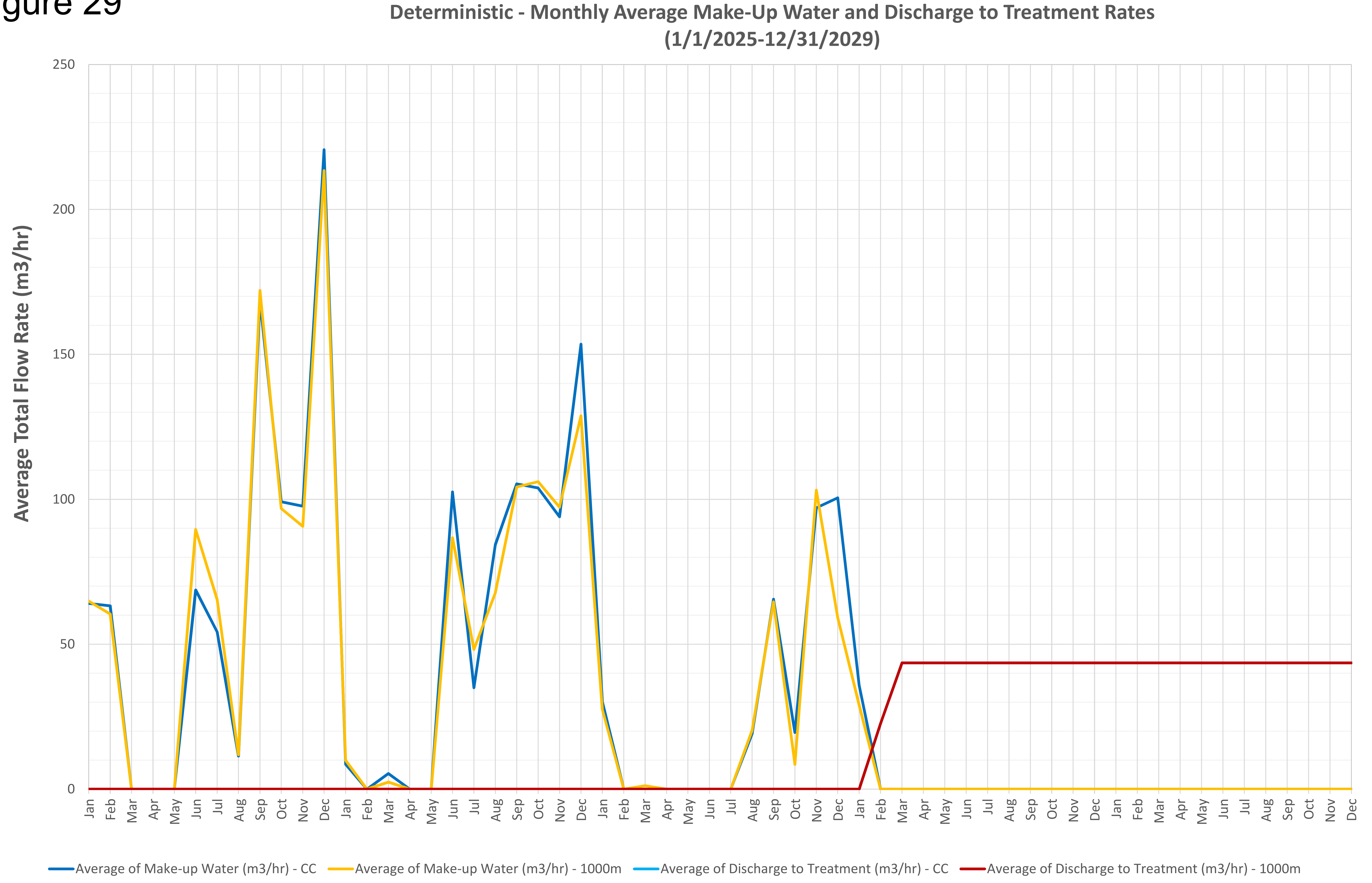

Deterministic - Monthly Average Make-Up Water and Discharge to Treatment Rates
(1/1/2025-12/31/2029)
Average Total Flow Rate (m3/hr)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Make-up Water (m3/hr) - CC
Average of Make-up Water (m3/hr) - 1000m
Average of Discharge to Treatment (m3/hr) - CC
Average of Discharge to Treatment (m3/hr) - 1000m

Figure 30

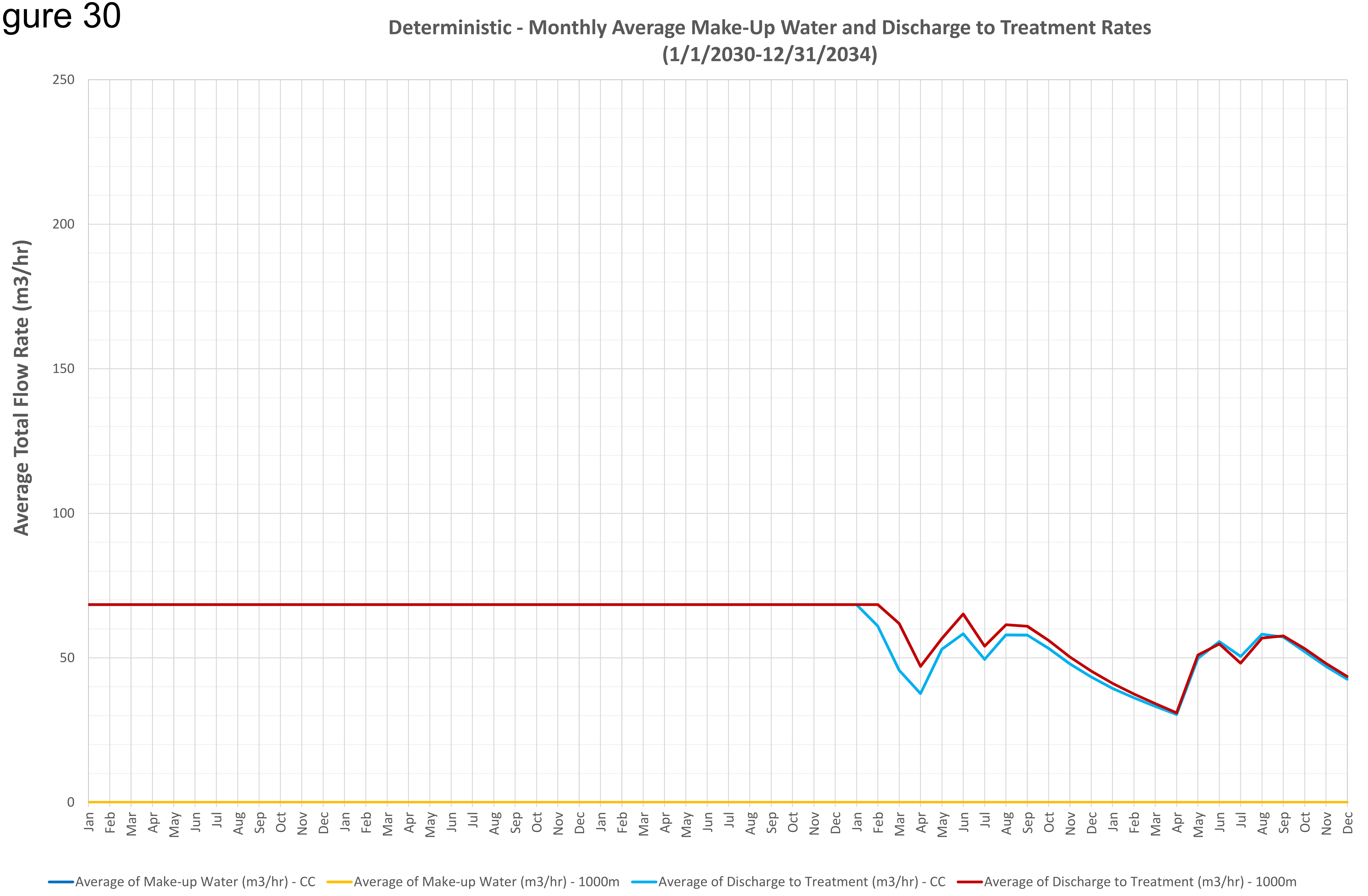

Deterministic - Monthly Average Make-Up Water and Discharge to Treatment Rates
(1/1/2030-12/31/2034)
Average Total Flow Rate (m3/hr)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Make-up Water (m3/hr) - CC
Average of Make-up Water (m3/hr) - 1000m
Average of Discharge to Treatment (m3/hr) - CC
Average of Discharge to Treatment (m3/hr) - 1000m

Figure 31

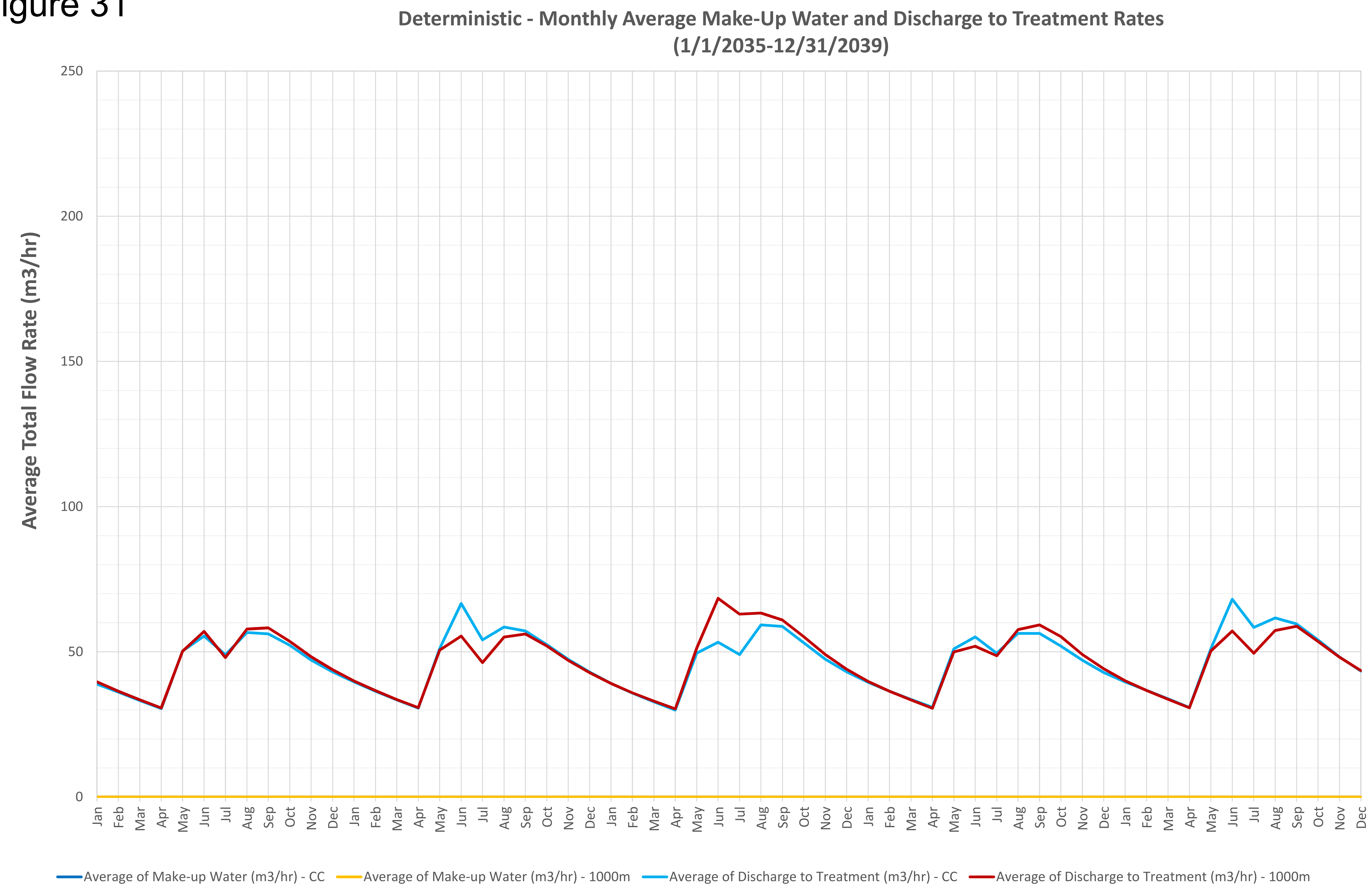

Deterministic - Monthly Average Make-Up Water and Discharge to Treatment Rates
(1/1/2035-12/31/2039)
Average Total Flow Rate (m3/hr)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average of Make-up Water (m3/hr) - CC
Average of Make-up Water (m3/hr) - 1000m
Average of Discharge to Treatment (m3/hr) - CC
Average of Discharge to Treatment (m3/hr) - 1000m

Figure 32

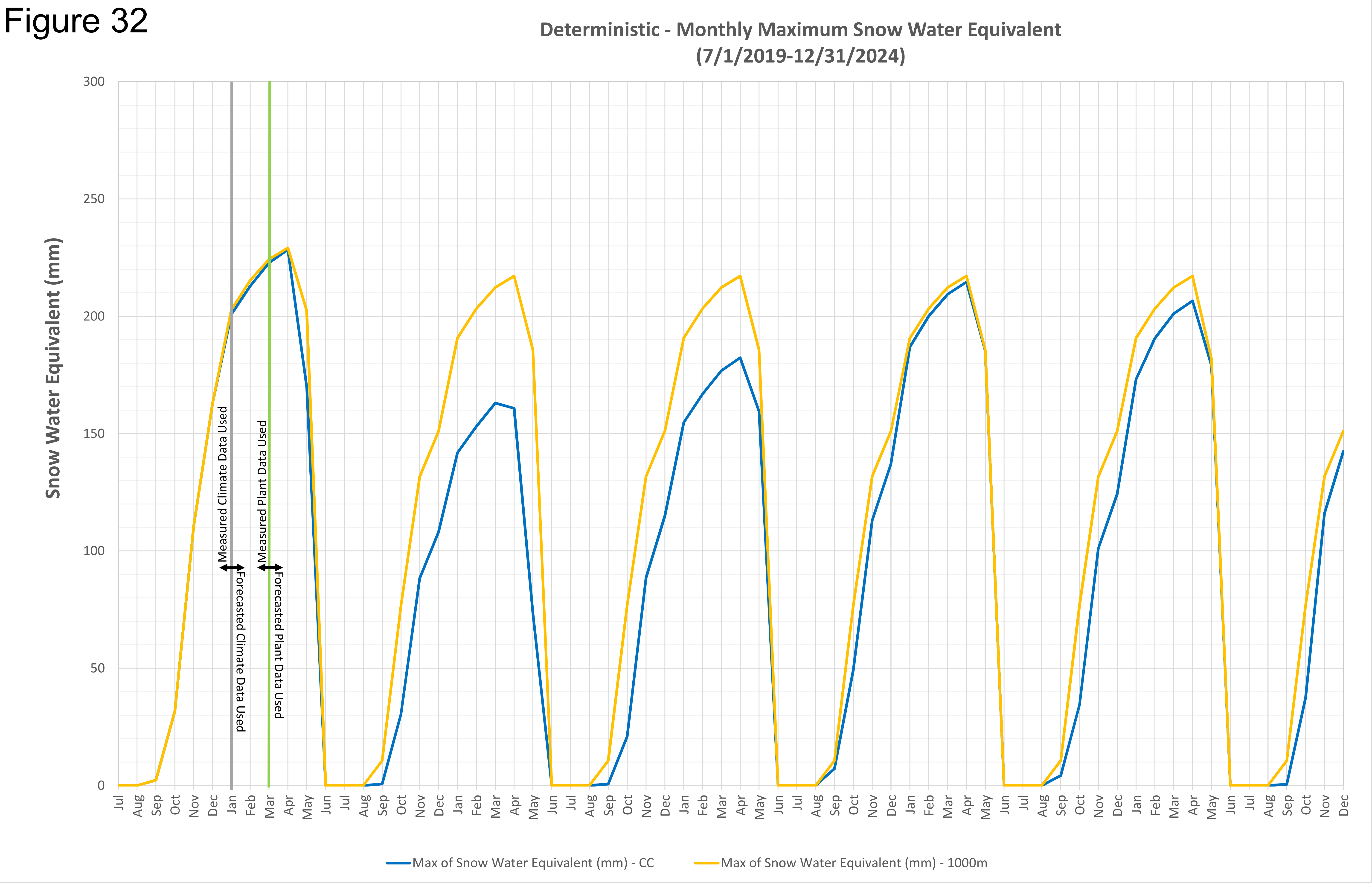

Deterministic - Monthly Maximum Snow Water Equivalent
(7/1/2019-12/31/2024)
Snow Water Equivalent (mm)
0
50
100
150
200
250
300
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Max of Snow Water Equivalent (mm) - CC
Max of Snow Water Equivalent (mm) - 1000m

Figure 33

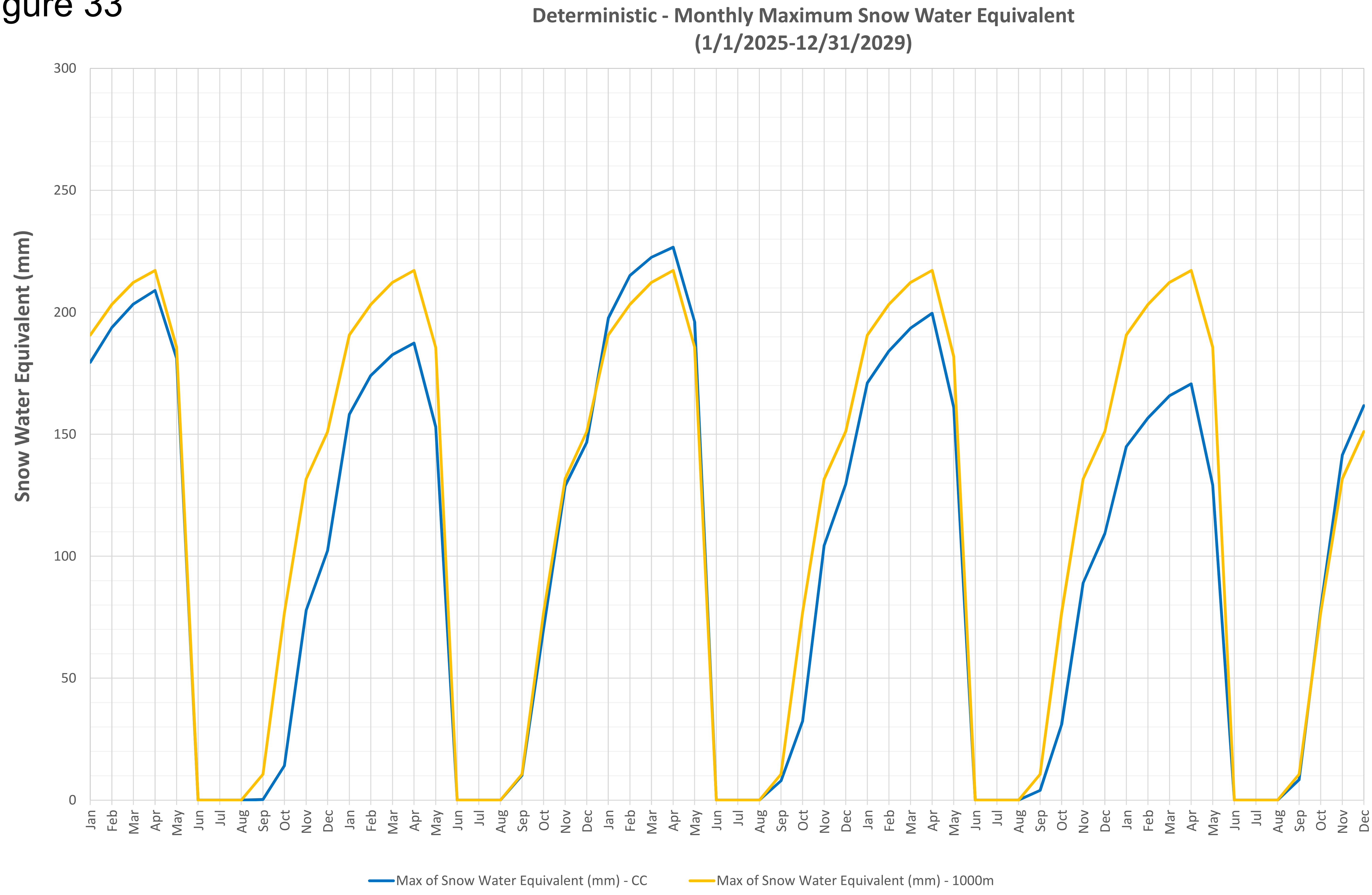

Deterministic - Monthly Maximum Snow Water Equivalent
(1/1/2025-12/31/2029)
Snow Water Equivalent (mm)
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Max of Snow Water Equivalent (mm) - CC
Max of Snow Water Equivalent (mm) - 1000m

Figure 34

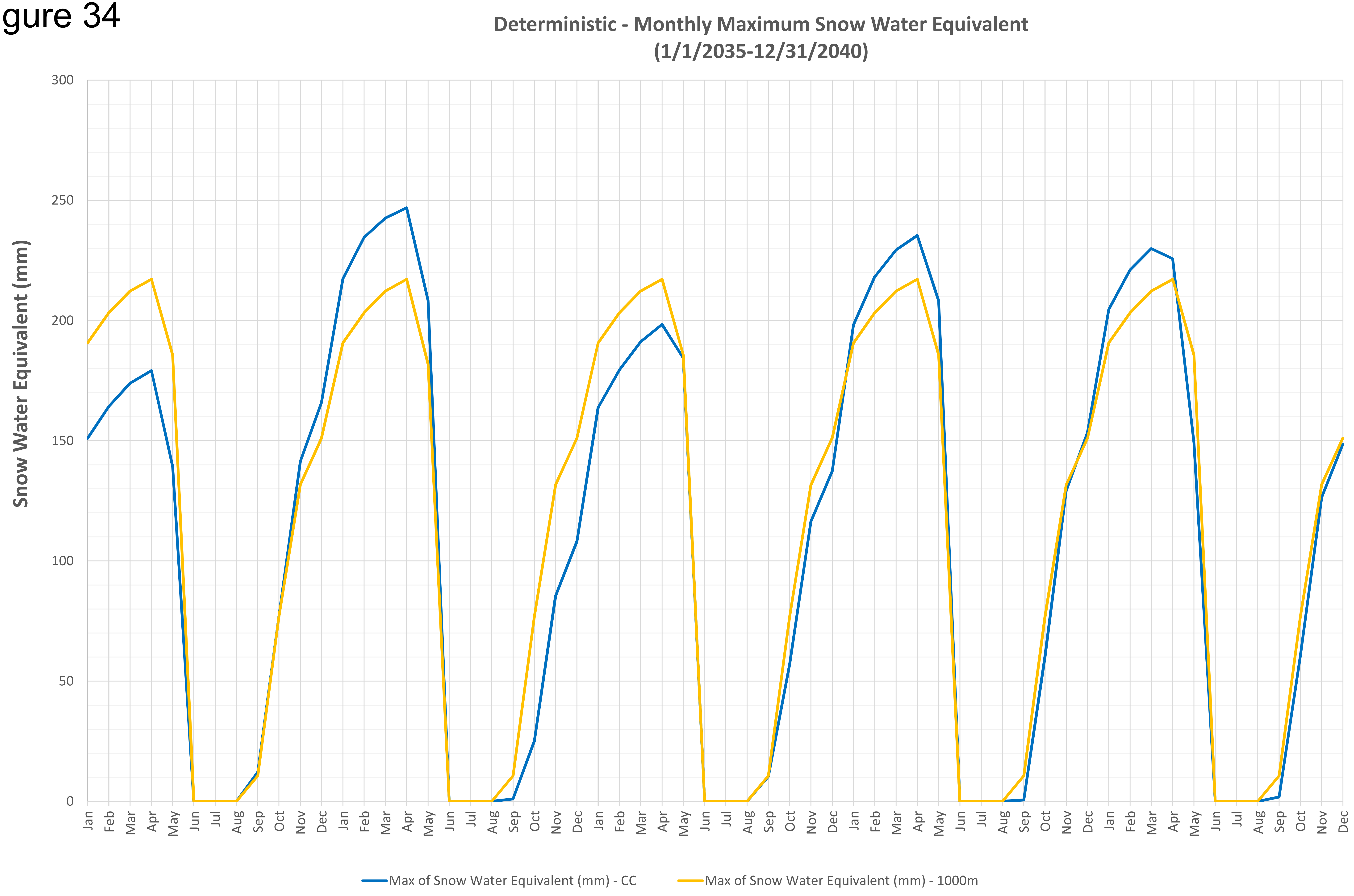

Deterministic - Monthly Maximum Snow Water Equivalent
(1/1/2035-12/31/2040)
Snow Water Equivalent (mm)
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Max of Snow Water Equivalent (mm) - CC
Max of Snow Water Equivalent (mm) - 1000m

Figure 35

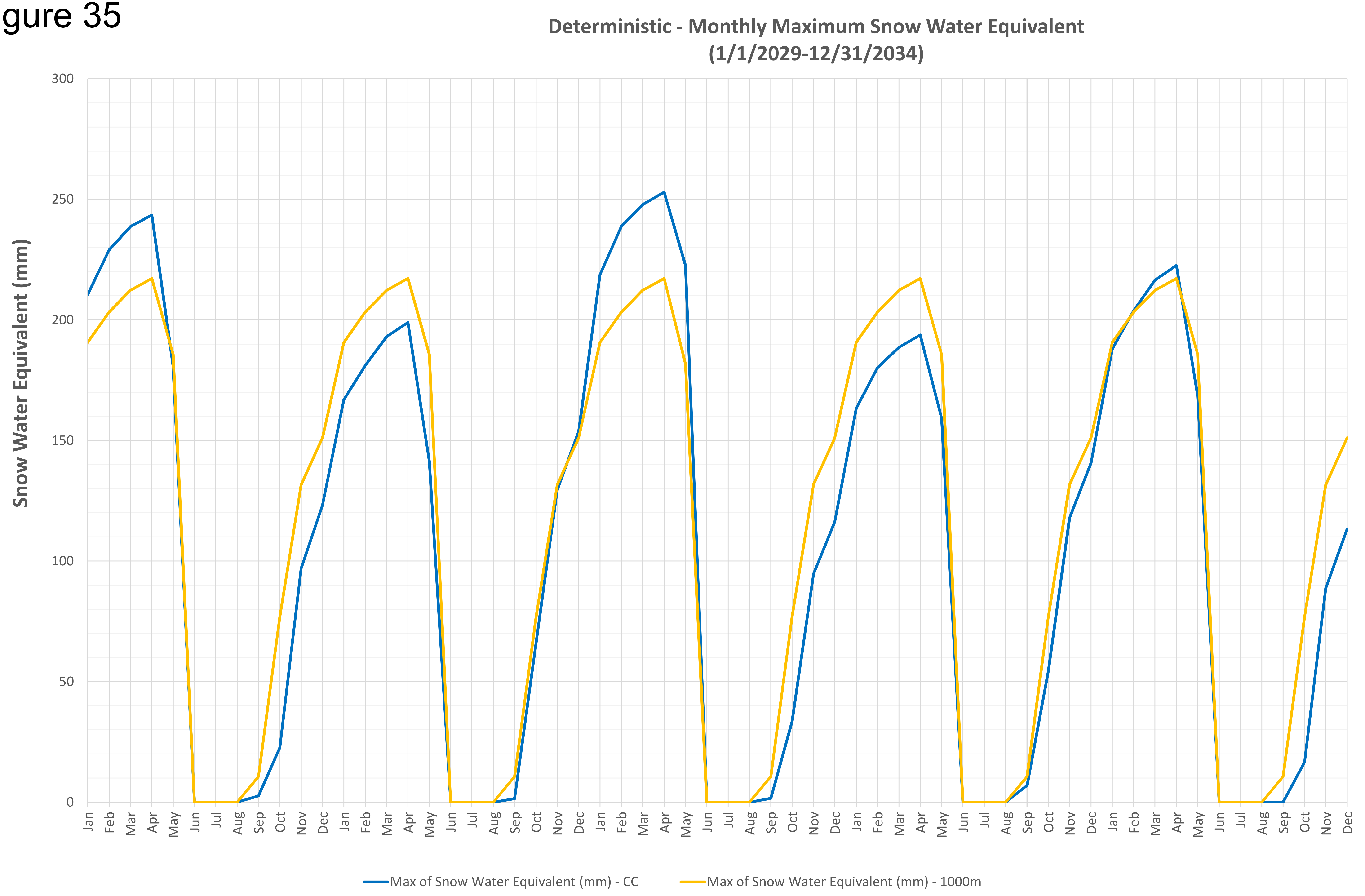
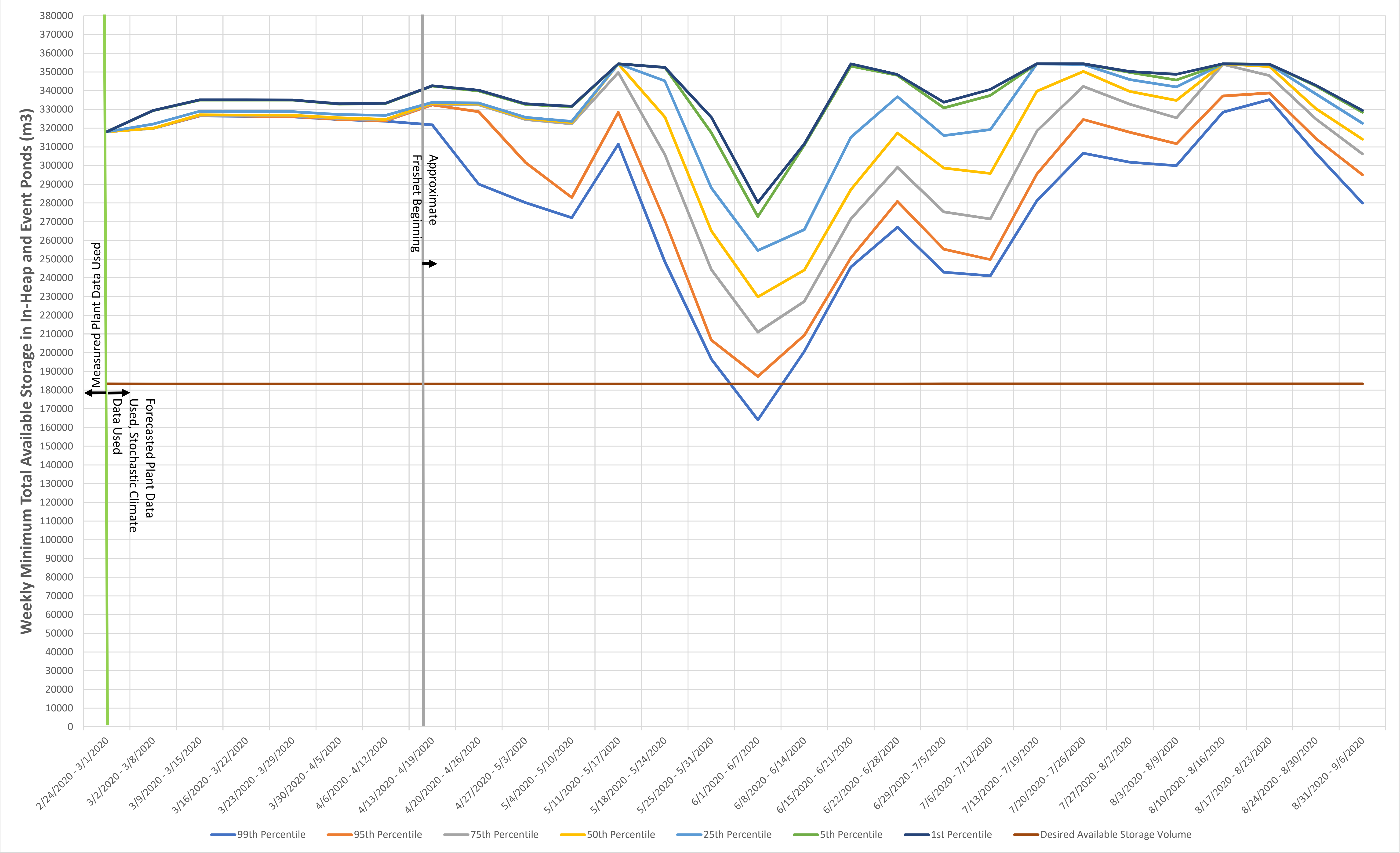
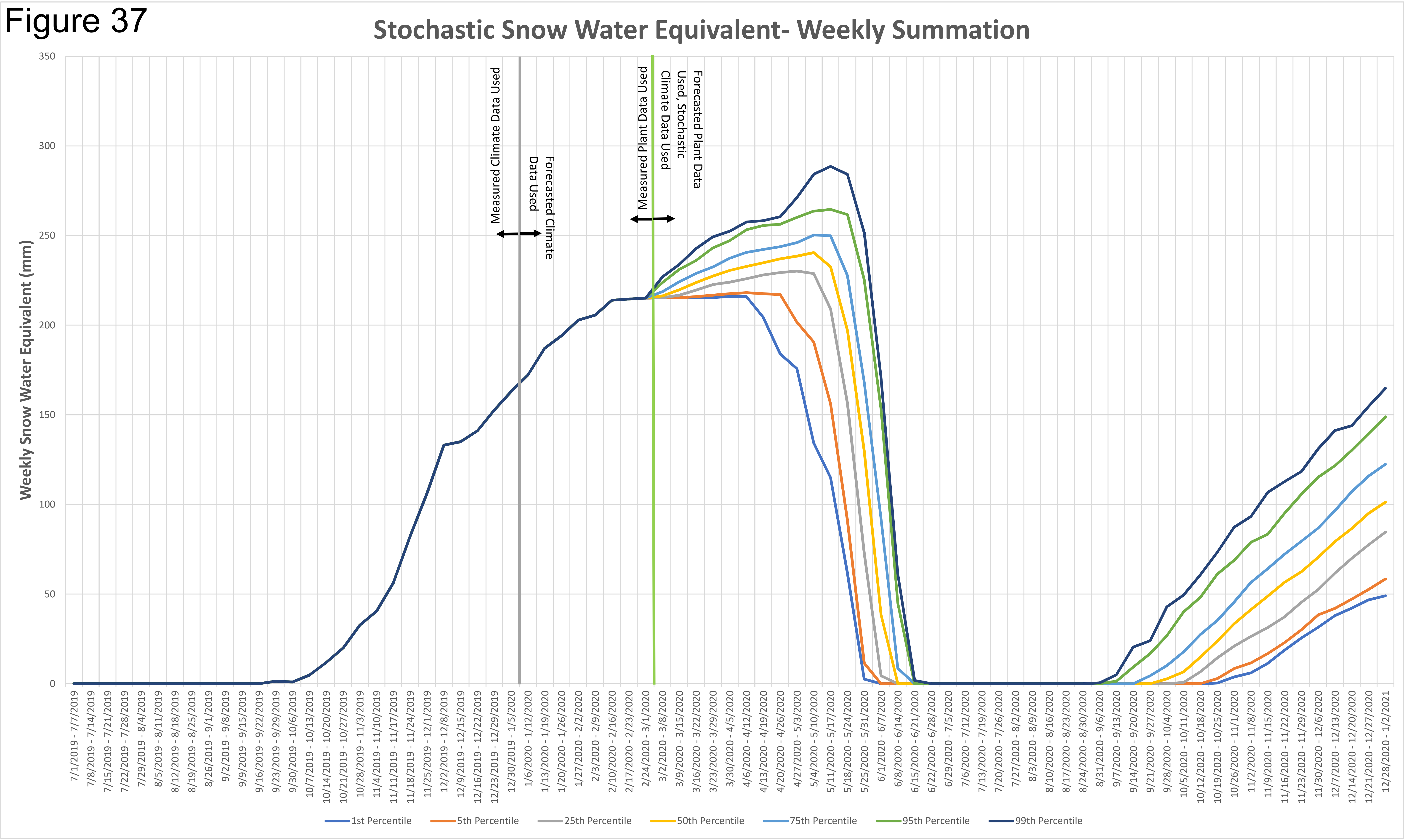

Deterministic - Monthly Maximum Snow Water Equivalent
(1/1/2029-12/31/2034)
Snow Water Equivalent (mm)
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Max of Snow Water Equivalent (mm) - CC
Max of Snow Water Equivalent (mm) - 1000m

Figure 36



Stochastic Total Available Storage Volume - Weekly Minimum

Figure 37


Stochastic Snow Water Equivalent- Weekly Summation
Weekly Snow Water Equivalent (mm)
350
300
250
200
150
100
50
0
Measured Climate Data Used
Forecasted Climate Data Used
Measured Plant Data Used
Forecasted Plant Data Used, Stochastic Climate Data Used
7/1/2019 - 7/7/2019
7/8/2019 - 7/14/2019
7/15/2019 - 7/21/2019
7/22/2019 - 7/28/2019
7/29/2019 - 8/4/2019
8/5/2019 - 8/11/2019
8/12/2019 - 8/18/2019
8/19/2019 - 8/25/2019
8/26/2019 - 9/1/2019
9/2/2019 - 9/8/2019
9/9/2019 - 9/15/2019
9/16/2019 - 9/22/2019
9/23/2019 - 9/29/2019
9/30/2019 - 10/6/2019
10/7/2019 - 10/13/2019
10/14/2019 - 10/20/2019
10/21/2019 - 10/27/2019
10/28/2019 - 11/3/2019
11/4/2019 - 11/10/2019
11/11/2019 - 11/17/2019
11/18/2019 - 11/24/2019
11/25/2019 - 12/1/2019
12/2/2019 - 12/8/2019
12/9/2019 - 12/15/2019
12/16/2019 - 12/22/2019
12/23/2019 - 12/29/2019
12/30/2019 - 1/5/2020
1/6/2020 - 1/12/2020
1/13/2020 - 1/19/2020
1/20/2020 - 1/26/2020
1/27/2020 - 2/2/2020
2/3/2020 - 2/9/2020
2/10/2020 - 2/16/2020
2/17/2020 - 2/23/2020
2/24/2020 - 3/1/2020
3/2/2020 - 3/8/2020
3/9/2020 - 3/15/2020
3/16/2020 - 3/22/2020
3/23/2020 - 3/29/2020
3/30/2020 - 4/5/2020
4/6/2020 - 4/12/2020
4/13/2020 - 4/19/2020
4/20/2020 - 4/26/2020
4/27/2020 - 5/3/2020
5/4/2020 - 5/10/2020
5/11/2020 - 5/17/2020
5/18/2020 - 5/24/2020
5/25/2020 - 5/31/2020
6/1/2020 - 6/7/2020
6/8/2020 - 6/14/2020
6/15/2020 - 6/21/2020
6/22/2020 - 6/28/2020
6/29/2020 - 7/5/2020
7/6/2020 - 7/12/2020
7/13/2020 - 7/19/2020
7/20/2020 - 7/26/2020
7/27/2020 - 8/2/2020
8/3/2020 - 8/9/2020
8/10/2020 - 8/16/2020
8/17/2020 - 8/23/2020
8/24/2020 - 8/30/2020
8/31/2020 - 9/6/2020
9/7/2020 - 9/13/2020
9/14/2020 - 9/20/2020
9/21/2020 - 9/27/2020
9/28/2020 - 10/4/2020
10/5/2020 - 10/11/2020
10/12/2020 - 10/18/2020
10/19/2020 - 10/25/2020
10/26/2020 - 11/1/2020
11/2/2020 - 11/8/2020
11/9/2020 - 11/15/2020
11/16/2020 - 11/22/2020
11/23/2020 - 11/29/2020
11/30/2020 - 12/6/2020
12/7/2020 - 12/13/2020
12/14/2020 - 12/20/2020
12/21/2020 - 12/27/2020
12/28/2020 - 1/2/2021
1st Percentile
5th Percentile
25th Percentile
50th Percentile
75th Percentile
95th Percentile
99th Percentile