SUPPLEMENTARY MATERIAL:
Reconciling the water balance of large lake systems

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Contents

This supplementary material includes the following:

- Large Lake Statistical Water Balance Model (L2SWBM) code in the BUGS language
- Time series of historical data and new water balance estimates from L2SWBM with a 1-month rolling window
- Time series of historical data and new water balance estimates from L2SWBM with a 6-month rolling window
- Time series of historical data and new water balance estimates from L2SWBM with a 12-month rolling window

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```
### THIS MODEL CODE WAS GENERATED BY AN R SCRIPT
# Parameters not defined here were defined in R and submitted to JAGS
model {
    for (j in posteriorStartMonth:posteriorEndMonth){

        ############
        ## Priors:
        ############

        ### SUPERIOR
        superiorPrecip[j] ~ dgamma(superiorPriorPrecipShape[m[j]],
        superiorPriorPrecipRate[m[j]])
        superiorEvap[j] ~ dnorm(superiorEvapPriorMean[m[j]],
        superiorEvapPriorPrecision[m[j]])
        superiorRunoff[j]   <- exp(superiorLogRunoff[j])
        superiorLogRunoff[j] ~ dnorm(superiorRunoffLogPriorMean[m[j]],
        superiorRunoffLogPriorPrecision[m[j]])
        superiorOutflow[j] ~ dnorm(superiorOutflowPriorMean[m[j]],
        superiorOutflowPriorPrecision[m[j]])
        superiorDiversion[j] ~ dnorm(superiorDiversionPriorMean[m[j]],
        superiorDiversionPriorPrecision[m[j]])

        ### MICHIGAN-HURON
        miHuronPrecip[j]    ~ dgamma(miHuronPriorPrecipShape[m[j]],
        miHuronPriorPrecipRate[m[j]])
        miHuronEvap[j] ~ dnorm(miHuronEvapPriorMean[m[j]],
        miHuronEvapPriorPrecision[m[j]])
        miHuronRunoff[j]    <- exp(miHuronLogRunoff[j])
        miHuronLogRunoff[j] ~ dnorm(miHuronRunoffLogPriorMean[m[j]],
        miHuronRunoffLogPriorPrecision[m[j]])
        miHuronOutflow[j] ~ dnorm(miHuronOutflowPriorMean[m[j]],
        miHuronOutflowPriorPrecision[m[j]])
        miHuronDiversion[j] ~ dnorm(miHuronDiversionPriorMean[m[j]],
        miHuronDiversionPriorPrecision[m[j]])

        ### CLAIR
        clairNBS[j] ~ dnorm(clairNBSPriorMean[m[j]],
        clairNBSPriorPrecision[m[j]])
        clairOutflow[j] ~ dnorm(clairOutflowPriorMean[m[j]],
        clairOutflowPriorPrecision[m[j]])

        ### ERIE
        eriePrecip[j] ~ dgamma(eriePriorPrecipShape[m[j]],
        eriePriorPrecipRate[m[j]])
        erieEvap[j] ~ dnorm(erieEvapPriorMean[m[j]],
        erieEvapPriorPrecision[m[j]])
        erieRunoff[j]   <- exp(erieLogRunoff[j])
        erieLogRunoff[j] ~ dnorm(erieRunoffLogPriorMean[m[j]],
        erieRunoffLogPriorPrecision[m[j]])
        erieOutflow[j] ~ dnorm(erieOutflowPriorMean[m[j]],
        erieOutflowPriorPrecision[m[j]])
        erieDiversion[j] ~ dnorm(erieDiversionPriorMean[m[j]],
        erieDiversionPriorPrecision[m[j]])
```

```
### ONTARIO
ontarioPrecip[j] ~ dgamma(ontarioPriorPrecipShape[m[j]],
ontarioPriorPrecipRate[m[j]])
ontarioEvap[j] ~ dnorm(ontarioEvapPriorMean[m[j]],
ontarioEvapPriorPrecision[m[j]])
ontarioRunoff[j]    <- exp(ontarioLogRunoff[j])
ontarioLogRunoff[j] ~ dnorm(ontarioRunoffLogPriorMean[m[j]],
ontarioRunoffLogPriorPrecision[m[j]])
ontarioOutflow[j] ~ dnorm(ontarioOutflowPriorMean[m[j]],
ontarioOutflowPriorPrecision[m[j]])

#####################################################
## LIKELIHOOD FUNCTIONS
#####################################################

ySuperiorOutflow1[j]  ~ dnorm(ySuperiorOutflow1Mean[j],
ySuperiorOutflow1Prec)
ySuperiorOutflow2[j]  ~ dnorm(ySuperiorOutflow2Mean[j],
ySuperiorOutflow2Prec)
ySuperiorDiversion1[j]  ~ dnorm(ySuperiorDiversion1Mean[j],
ySuperiorDiversion1Prec)

ySuperiorOutflow1Mean[j] <- superiorOutflow[j] +
ySuperiorOutflow1Bias[m[j]]
ySuperiorOutflow2Mean[j] <- superiorOutflow[j] +
ySuperiorOutflow2Bias[m[j]]
ySuperiorDiversion1Mean[j] <- superiorDiversion[j] +
ySuperiorDiversion1Bias[m[j]]

yMiHuronOutflow1[j]  ~ dnorm(yMiHuronOutflow1Mean[j],
yMiHuronOutflow1Prec)
yMiHuronOutflow2[j]  ~ dnorm(yMiHuronOutflow2Mean[j],
yMiHuronOutflow2Prec)
yMiHuronDiversion1[j]  ~ dnorm(yMiHuronDiversion1Mean[j],
yMiHuronDiversion1Prec)

yMiHuronOutflow1Mean[j] <- miHuronOutflow[j] +
yMiHuronOutflow1Bias[m[j]]
yMiHuronOutflow2Mean[j] <- miHuronOutflow[j] +
yMiHuronOutflow2Bias[m[j]]
yMiHuronDiversion1Mean[j] <- miHuronDiversion[j] +
yMiHuronDiversion1Bias[m[j]]

yClairOutflow1[j]  ~ dnorm(yClairOutflow1Mean[j], yClairOutflow1Prec)
yClairOutflow2[j]  ~ dnorm(yClairOutflow2Mean[j], yClairOutflow2Prec)

yClairOutflow1Mean[j] <- clairOutflow[j] + yClairOutflow1Bias[m[j]]
yClairOutflow2Mean[j] <- clairOutflow[j] + yClairOutflow2Bias[m[j]]

yErieOutflow1[j]  ~ dnorm(yErieOutflow1Mean[j], yErieOutflow1Prec)
yErieDiversion1[j]  ~ dnorm(yErieDiversion1Mean[j],
yErieDiversion1Prec)

yErieOutflow1Mean[j] <- erieOutflow[j] + yErieOutflow1Bias[m[j]]
yErieDiversion1Mean[j] <- erieDiversion[j] + yErieDiversion1Bias[m[j]]
```

```
yOntarioOutflow1[j]  ~ dnorm(yOntarioOutflow1Mean[j],
yOntarioOutflow1Prec)

yOntarioOutflow1Mean[j] <- ontarioOutflow[j] +
yOntarioOutflow1Bias[m[j]]
ySuperiorPrecip1[j] ~ dnorm(ySuperiorPrecip1Mean[j],
ySuperiorPrecip1Prec)
ySuperiorPrecip1Mean[j] <- superiorPrecip[j] +
ySuperiorPrecip1Bias[m[j]]

ySuperiorPrecip2[j] ~ dnorm(ySuperiorPrecip2Mean[j],
ySuperiorPrecip2Prec)
ySuperiorPrecip2Mean[j] <- superiorPrecip[j] +
ySuperiorPrecip2Bias[m[j]]

yMiHuronPrecip1[j] ~ dnorm(yMiHuronPrecip1Mean[j],
yMiHuronPrecip1Prec)
yMiHuronPrecip1Mean[j] <- miHuronPrecip[j] + yMiHuronPrecip1Bias[m[j]]

yMiHuronPrecip2[j] ~ dnorm(yMiHuronPrecip2Mean[j],
yMiHuronPrecip2Prec)
yMiHuronPrecip2Mean[j] <- miHuronPrecip[j] + yMiHuronPrecip2Bias[m[j]]

yEriePrecip1[j] ~ dnorm(yEriePrecip1Mean[j], yEriePrecip1Prec)
yEriePrecip1Mean[j] <- eriePrecip[j] + yEriePrecip1Bias[m[j]]

yEriePrecip2[j] ~ dnorm(yEriePrecip2Mean[j], yEriePrecip2Prec)
yEriePrecip2Mean[j] <- eriePrecip[j] + yEriePrecip2Bias[m[j]]

yOntarioPrecip1[j] ~ dnorm(yOntarioPrecip1Mean[j],
yOntarioPrecip1Prec)
yOntarioPrecip1Mean[j] <- ontarioPrecip[j] + yOntarioPrecip1Bias[m[j]]

yOntarioPrecip2[j] ~ dnorm(yOntarioPrecip2Mean[j],
yOntarioPrecip2Prec)
yOntarioPrecip2Mean[j] <- ontarioPrecip[j] + yOntarioPrecip2Bias[m[j]]

ySuperiorEvap1[j] ~ dnorm(ySuperiorEvap1Mean[j], ySuperiorEvap1Prec)
ySuperiorEvap1Mean[j] <- superiorEvap[j] + ySuperiorEvap1Bias[m[j]]

ySuperiorEvap2[j] ~ dnorm(ySuperiorEvap2Mean[j], ySuperiorEvap2Prec)
ySuperiorEvap2Mean[j] <- superiorEvap[j] + ySuperiorEvap2Bias[m[j]]

yMiHuronEvap1[j] ~ dnorm(yMiHuronEvap1Mean[j], yMiHuronEvap1Prec)
yMiHuronEvap1Mean[j] <- miHuronEvap[j] + yMiHuronEvap1Bias[m[j]]

yMiHuronEvap2[j] ~ dnorm(yMiHuronEvap2Mean[j], yMiHuronEvap2Prec)
yMiHuronEvap2Mean[j] <- miHuronEvap[j] + yMiHuronEvap2Bias[m[j]]

yErieEvap1[j] ~ dnorm(yErieEvap1Mean[j], yErieEvap1Prec)
yErieEvap1Mean[j] <- erieEvap[j] + yErieEvap1Bias[m[j]]

yErieEvap2[j] ~ dnorm(yErieEvap2Mean[j], yErieEvap2Prec)
yErieEvap2Mean[j] <- erieEvap[j] + yErieEvap2Bias[m[j]]
```

```
    yOntarioEvap1[j] ~ dnorm(yOntarioEvap1Mean[j], yOntarioEvap1Prec)
    yOntarioEvap1Mean[j] <- ontarioEvap[j] + yOntarioEvap1Bias[m[j]]

    yOntarioEvap2[j] ~ dnorm(yOntarioEvap2Mean[j], yOntarioEvap2Prec)
    yOntarioEvap2Mean[j] <- ontarioEvap[j] + yOntarioEvap2Bias[m[j]]

    ySuperiorRunoff1[j] ~ dnorm(ySuperiorRunoff1Mean[j],
    ySuperiorRunoff1Prec)
    ySuperiorRunoff1Mean[j] <- superiorRunoff[j] +
    ySuperiorRunoff1Bias[m[j]]

    ySuperiorRunoff2[j] ~ dnorm(ySuperiorRunoff2Mean[j],
    ySuperiorRunoff2Prec)
    ySuperiorRunoff2Mean[j] <- superiorRunoff[j] +
    ySuperiorRunoff2Bias[m[j]]

    yMiHuronRunoff1[j] ~ dnorm(yMiHuronRunoff1Mean[j],
    yMiHuronRunoff1Prec)
    yMiHuronRunoff1Mean[j] <- miHuronRunoff[j] + yMiHuronRunoff1Bias[m[j]]

    yMiHuronRunoff2[j] ~ dnorm(yMiHuronRunoff2Mean[j],
    yMiHuronRunoff2Prec)
    yMiHuronRunoff2Mean[j] <- miHuronRunoff[j] + yMiHuronRunoff2Bias[m[j]]

    yErieRunoff1[j] ~ dnorm(yErieRunoff1Mean[j], yErieRunoff1Prec)
    yErieRunoff1Mean[j] <- erieRunoff[j] + yErieRunoff1Bias[m[j]]

    yErieRunoff2[j] ~ dnorm(yErieRunoff2Mean[j], yErieRunoff2Prec)
    yErieRunoff2Mean[j] <- erieRunoff[j] + yErieRunoff2Bias[m[j]]

    yOntarioRunoff1[j] ~ dnorm(yOntarioRunoff1Mean[j],
    yOntarioRunoff1Prec)
    yOntarioRunoff1Mean[j] <- ontarioRunoff[j] + yOntarioRunoff1Bias[m[j]]

    yOntarioRunoff2[j] ~ dnorm(yOntarioRunoff2Mean[j],
    yOntarioRunoff2Prec)
    yOntarioRunoff2Mean[j] <- ontarioRunoff[j] + yOntarioRunoff2Bias[m[j]]

    yClairNBS1[j] ~ dnorm(yClairNBS1Mean[j], yClairNBS1Prec)
    yClairNBS1Mean[j] <- clairNBS[j] + yClairNBS1Bias[m[j]]

    yClairNBS2[j] ~ dnorm(yClairNBS2Mean[j], yClairNBS2Prec)
    yClairNBS2Mean[j] <- clairNBS[j] + yClairNBS2Bias[m[j]]

    yClairNBS3[j] ~ dnorm(yClairNBS3Mean[j], yClairNBS3Prec)
    yClairNBS3Mean[j] <- clairNBS[j] + yClairNBS3Bias[m[j]]

}
```

```
### WATER BALANCE MODEL WITH ROLLING WINDOW
for(k in rollPeriod:posteriorEndMonth){

    ### SUPERIOR
    ySuperiorRStore[k] ~ dnorm(superiorRStore[k], ySuperiorRStorePrec)

    superiorRStore[k] <- (
        sum(superiorPrecip[(k-rollPeriod+1):k])
        -sum(superiorEvap[(k-rollPeriod+1):k])
        +sum(superiorRunoff[(k-rollPeriod+1):k])
        -superiorOutflow_mm[k]
        +superiorDiversion_mm[k]
        +sum(superiorProcError[m[(k-rollPeriod+1):k]])
    )

    superiorOutflow_mm[k] <- sum(superiorOutflow[(k-
    rollPeriod+1):k]/supArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    superiorDiversion_mm[k] <- sum(superiorDiversion[(k-
    rollPeriod+1):k]/supArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])

    ### MICHIGAN-HURON
    yMiHuronRStore[k] ~ dnorm(miHuronRStore[k], yMiHuronRStorePrec)

    miHuronRStore[k] <- (
        sum(miHuronPrecip[(k-rollPeriod+1):k])
        -sum(miHuronEvap[(k-rollPeriod+1):k])
        +sum(miHuronRunoff[(k-rollPeriod+1):k])
        -miHuronOutflow_mm[k]
        +miHuronInflow_mm[k]
        -miHuronDiversion_mm[k]
        +sum(miHuronProcError[m[(k-rollPeriod+1):k]])
    )

    miHuronOutflow_mm[k] <- sum(miHuronOutflow[(k-
    rollPeriod+1):k]/mhgArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    miHuronInflow_mm[k] <- sum(superiorOutflow[(k-
    rollPeriod+1):k]/mhgArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    miHuronDiversion_mm[k] <- sum(miHuronDiversion[(k-
    rollPeriod+1):k]/mhgArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])

    ### CLAIR
    yClairRStore[k] ~ dnorm(clairRStore[k], yClairRStorePrec);

    clairRStore[k] <- (
        sum(clairNBS[(k-rollPeriod+1):k])
        + sum(miHuronOutflow[(k-rollPeriod+1):k])
        - sum(clairOutflow[(k-rollPeriod+1):k])
        + sum(clairProcError[m[(k-rollPeriod+1):k]])
    )
```

```
    ### ERIE
    yErieRStore[k] ~ dnorm(erieRStore[k], yErieRStorePrec)

    erieRStore[k] <- (
        sum(eriePrecip[(k-rollPeriod+1):k])
        -sum(erieEvap[(k-rollPeriod+1):k])
        +sum(erieRunoff[(k-rollPeriod+1):k])
        -erieOutflow_mm[k]
        # DETROIT RIVER
        +erieInflow_mm[k]
        # WELLAND CANAL
        -erieDiversion_mm[k]
        +sum(erieProcError[m[(k-rollPeriod+1):k]])
    )

    erieOutflow_mm[k] <- sum(erieOutflow[(k-
    rollPeriod+1):k]/eriArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    erieInflow_mm[k] <- sum(clairOutflow[(k-
    rollPeriod+1):k]/eriArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    erieDiversion_mm[k] <- sum(erieDiversion[(k-
    rollPeriod+1):k]/eriArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])

    ### ONTARIO
    yOntarioRStore[k] ~ dnorm(ontarioRStore[k], yOntarioRStorePrec)

    ontarioRStore[k] <- (
        sum(ontarioPrecip[(k-rollPeriod+1):k])
        -sum(ontarioEvap[(k-rollPeriod+1):k])
        +sum(ontarioRunoff[(k-rollPeriod+1):k])
        -ontarioOutflow_mm[k]
        +ontarioInflow_mm[k]
        +sum(ontarioProcError[m[(k-rollPeriod+1):k]])
    )

    ontarioOutflow_mm[k] <- sum(ontarioOutflow[(k-
    rollPeriod+1):k]/ontArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])
    ontarioInflow_mm[k] <- sum(erieOutflow[(k-
    rollPeriod+1):k]/ontArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k]) + sum(erieDiversion[(k-
    rollPeriod+1):k]/ontArea*1000*secondsInADay*dayVector[(k-
    rollPeriod+1):k])

}
```

```
#############################
## BIAS TERMS
#############################
for (i in 1:12){
    superiorProcError[i] ~ dnorm(0,0.01)
    miHuronProcError[i] ~ dnorm(0,0.01)
    clairProcError[i] ~ dnorm(0,0.0625) # For CMS equivalent
    erieProcError[i] ~ dnorm(0,0.01)
    ontarioProcError[i] ~ dnorm(0,0.01)

    ySuperiorOutflow1Bias[i] ~ dnorm(0,ySuperiorOutflow1BiasPrec[i])
    ySuperiorOutflow2Bias[i] ~ dnorm(0,ySuperiorOutflow2BiasPrec[i])
    ySuperiorDiversion1Bias[i] ~ dnorm(0,ySuperiorDiversion1BiasPrec[i])
    yMiHuronOutflow1Bias[i] ~ dnorm(0,yMiHuronOutflow1BiasPrec[i])
    yMiHuronOutflow2Bias[i] ~ dnorm(0,yMiHuronOutflow2BiasPrec[i])
    yMiHuronDiversion1Bias[i] ~ dnorm(0,yMiHuronDiversion1BiasPrec[i])
    yClairOutflow1Bias[i] ~ dnorm(0,yClairOutflow1BiasPrec[i])
    yClairOutflow2Bias[i] ~ dnorm(0,yClairOutflow2BiasPrec[i])
    yErieOutflow1Bias[i] ~ dnorm(0,yErieOutflow1BiasPrec[i])
    yErieDiversion1Bias[i] ~ dnorm(0,yErieDiversion1BiasPrec[i])
    yOntarioOutflow1Bias[i] ~ dnorm(0,yOntarioOutflow1BiasPrec[i])
    ySuperiorPrecip1Bias[i] ~ dnorm(0,0.01)
    ySuperiorPrecip2Bias[i] ~ dnorm(0,0.01)
    yMiHuronPrecip1Bias[i] ~ dnorm(0,0.01)
    yMiHuronPrecip2Bias[i] ~ dnorm(0,0.01)
    yErie Precip1Bias[i] ~ dnorm(0,0.01)
    yErie Precip2Bias[i] ~ dnorm(0,0.01)
    yOntarioPrecip1Bias[i] ~ dnorm(0,0.01)
    yOntarioPrecip2Bias[i] ~ dnorm(0,0.01)
    ySuperiorEvap1Bias[i] ~ dnorm(0,0.01)
    ySuperiorEvap2Bias[i] ~ dnorm(0,0.01)
    yMiHuronEvap1Bias[i] ~ dnorm(0,0.01)
    yMiHuronEvap2Bias[i] ~ dnorm(0,0.01)
    yErieEvap1Bias[i] ~ dnorm(0,0.01)
    yErieEvap2Bias[i] ~ dnorm(0,0.01)
    yOntarioEvap1Bias[i] ~ dnorm(0,0.01)
    yOntarioEvap2Bias[i] ~ dnorm(0,0.01)
    ySuperiorRunoff1Bias[i] ~ dnorm(0,0.01)
    ySuperiorRunoff2Bias[i] ~ dnorm(0,0.01)
    yMiHuronRunoff1Bias[i] ~ dnorm(0,0.01)
    yMiHuronRunoff2Bias[i] ~ dnorm(0,0.01)
    yErieRunoff1Bias[i] ~ dnorm(0,0.01)
    yErieRunoff2Bias[i] ~ dnorm(0,0.01)
    yOntarioRunoff1Bias[i] ~ dnorm(0,0.01)
    yOntarioRunoff2Bias[i] ~ dnorm(0,0.01)
    yClairNBS1Bias[i] ~ dnorm(0,0.0625) # For CMS equivalent
    yClairNBS2Bias[i] ~ dnorm(0,0.0625) # For CMS equivalent
    yClairNBS3Bias[i] ~ dnorm(0,0.0625) # For CMS equivalent
}
```

```
##############################
## PRECISION FOR OBSERVATIONS
##############################
ySuperiorRStorePrec   ~ dgamma(0.1,0.1)
ySuperiorOutflow1Prec ~ dgamma(0.1,0.1)
ySuperiorOutflow2Prec ~ dgamma(0.1,0.1)
ySuperiorDiversion1Prec ~ dgamma(0.1,0.1)

yMiHuronRStorePrec    ~ dgamma(0.1,0.1)
yMiHuronOutflow1Prec ~ dgamma(0.1,0.1)
yMiHuronOutflow2Prec ~ dgamma(0.1,0.1)
yMiHuronDiversion1Prec ~ dgamma(0.1,0.1)

yClairRStorePrec   ~ dgamma(0.1,0.1)
yClairOutflow1Prec ~ dgamma(0.1,0.1)
yClairOutflow2Prec ~ dgamma(0.1,0.1)

yErieRStorePrec   ~ dgamma(0.1,0.1)
yErieOutflow1Prec ~ dgamma(0.1,0.1)
yErieDiversion1Prec ~ dgamma(0.1,0.1)

yOntarioRStorePrec ~ dgamma(0.1,0.1)
yOntarioOutflow1Prec ~ dgamma(0.1,0.1)
ySuperiorPrecip1Prec ~ dgamma(0.1,0.1)
ySuperiorPrecip2Prec ~ dgamma(0.1,0.1)
yMiHuronPrecip1Prec ~ dgamma(0.1,0.1)
yMiHuronPrecip2Prec ~ dgamma(0.1,0.1)
yEriePrecip1Prec ~ dgamma(0.1,0.1)
yEriePrecip2Prec ~ dgamma(0.1,0.1)
yOntarioPrecip1Prec ~ dgamma(0.1,0.1)
yOntarioPrecip2Prec ~ dgamma(0.1,0.1)
ySuperiorEvap1Prec ~ dgamma(0.1,0.1)
ySuperiorEvap2Prec ~ dgamma(0.1,0.1)
yMiHuronEvap1Prec ~ dgamma(0.1,0.1)
yMiHuronEvap2Prec ~ dgamma(0.1,0.1)
yErieEvap1Prec ~ dgamma(0.1,0.1)
yErieEvap2Prec ~ dgamma(0.1,0.1)
yOntarioEvap1Prec ~ dgamma(0.1,0.1)
yOntarioEvap2Prec ~ dgamma(0.1,0.1)
ySuperiorRunoff1Prec ~ dgamma(0.1,0.1)
ySuperiorRunoff2Prec ~ dgamma(0.1,0.1)
yMiHuronRunoff1Prec ~ dgamma(0.1,0.1)
yMiHuronRunoff2Prec ~ dgamma(0.1,0.1)
yErieRunoff1Prec ~ dgamma(0.1,0.1)
yErieRunoff2Prec ~ dgamma(0.1,0.1)
yOntarioRunoff1Prec ~ dgamma(0.1,0.1)
yOntarioRunoff2Prec ~ dgamma(0.1,0.1)
yClairNBS1Prec ~ dgamma(0.1,0.1)
yClairNBS2Prec ~ dgamma(0.1,0.1)
yClairNBS3Prec ~ dgamma(0.1,0.1)
```

```
################################################################
# POSTERIOR PREDICTIVE DRAWS FOR VERIFICATION
################################################################
for(jp in posteriorStartMonth:posteriorEndMonth){

    ySuperiorOutflow1PP[jp] ~ dnorm(ySuperiorOutflow1Mean[jp],
    ySuperiorOutflow1Prec)
    ySuperiorOutflow2PP[jp] ~ dnorm(ySuperiorOutflow2Mean[jp],
    ySuperiorOutflow2Prec)
    ySuperiorDiversion1PP[jp] ~ dnorm(ySuperiorDiversion1Mean[jp],
    ySuperiorDiversion1Prec)
    yMiHuronOutflow1PP[jp] ~ dnorm(yMiHuronOutflow1Mean[jp],
    yMiHuronOutflow1Prec)
    yMiHuronOutflow2PP[jp] ~ dnorm(yMiHuronOutflow2Mean[jp],
    yMiHuronOutflow2Prec)
    yMiHuronDiversion1PP[jp] ~ dnorm(yMiHuronDiversion1Mean[jp],
    yMiHuronDiversion1Prec)
    yClairOutflow1PP[jp] ~ dnorm(yClairOutflow1Mean[jp],
    yClairOutflow1Prec)
    yClairOutflow2PP[jp] ~ dnorm(yClairOutflow2Mean[jp],
    yClairOutflow2Prec)
    yErieOutflow1PP[jp] ~ dnorm(yErieOutflow1Mean[jp], yErieOutflow1Prec)
    yErieDiversion1PP[jp] ~ dnorm(yErieDiversion1Mean[jp],
    yErieDiversion1Prec)
    yOntarioOutflow1PP[jp] ~ dnorm(yOntarioOutflow1Mean[jp],
    yOntarioOutflow1Prec)

    ySuperiorPrecip1PP[jp] ~ dnorm(ySuperiorPrecip1Mean[jp],
    ySuperiorPrecip1Prec)
    ySuperiorPrecip2PP[jp] ~ dnorm(ySuperiorPrecip2Mean[jp],
    ySuperiorPrecip2Prec)
    yMiHuronPrecip1PP[jp] ~ dnorm(yMiHuronPrecip1Mean[jp],
    yMiHuronPrecip1Prec)
    yMiHuronPrecip2PP[jp] ~ dnorm(yMiHuronPrecip2Mean[jp],
    yMiHuronPrecip2Prec)
    yEriePrecip1PP[jp] ~ dnorm(yEriePrecip1Mean[jp], yEriePrecip1Prec)
    yEriePrecip2PP[jp] ~ dnorm(yEriePrecip2Mean[jp], yEriePrecip2Prec)
    yOntarioPrecip1PP[jp] ~ dnorm(yOntarioPrecip1Mean[jp],
    yOntarioPrecip1Prec)
    yOntarioPrecip2PP[jp] ~ dnorm(yOntarioPrecip2Mean[jp],
    yOntarioPrecip2Prec)
    ySuperiorEvap1PP[jp] ~ dnorm(ySuperiorEvap1Mean[jp],
    ySuperiorEvap1Prec)
    ySuperiorEvap2PP[jp] ~ dnorm(ySuperiorEvap2Mean[jp],
    ySuperiorEvap2Prec)
    yMiHuronEvap1PP[jp] ~ dnorm(yMiHuronEvap1Mean[jp], yMiHuronEvap1Prec)
    yMiHuronEvap2PP[jp] ~ dnorm(yMiHuronEvap2Mean[jp], yMiHuronEvap2Prec)
    yErieEvap1PP[jp] ~ dnorm(yErieEvap1Mean[jp], yErieEvap1Prec)
    yErieEvap2PP[jp] ~ dnorm(yErieEvap2Mean[jp], yErieEvap2Prec)
    yOntarioEvap1PP[jp] ~ dnorm(yOntarioEvap1Mean[jp], yOntarioEvap1Prec)
    yOntarioEvap2PP[jp] ~ dnorm(yOntarioEvap2Mean[jp], yOntarioEvap2Prec)
    ySuperiorRunoff1PP[jp] ~ dnorm(ySuperiorRunoff1Mean[jp],
    ySuperiorRunoff1Prec)
    ySuperiorRunoff2PP[jp] ~ dnorm(ySuperiorRunoff2Mean[jp],
    ySuperiorRunoff2Prec)
```

```
    yMiHuronRunoff1PP[jp] ~ dnorm(yMiHuronRunoff1Mean[jp],
    yMiHuronRunoff1Prec)
    yMiHuronRunoff2PP[jp] ~ dnorm(yMiHuronRunoff2Mean[jp],
    yMiHuronRunoff2Prec)
    yErieRunoff1PP[jp] ~ dnorm(yErieRunoff1Mean[jp], yErieRunoff1Prec)
    yErieRunoff2PP[jp] ~ dnorm(yErieRunoff2Mean[jp], yErieRunoff2Prec)
    yOntarioRunoff1PP[jp] ~ dnorm(yOntarioRunoff1Mean[jp],
    yOntarioRunoff1Prec)
    yOntarioRunoff2PP[jp] ~ dnorm(yOntarioRunoff2Mean[jp],
    yOntarioRunoff2Prec)
    yClairNBS1PP[jp] ~ dnorm(yClairNBS1Mean[jp], yClairNBS1Prec)
    yClairNBS2PP[jp] ~ dnorm(yClairNBS2Mean[jp], yClairNBS2Prec)
    yClairNBS3PP[jp] ~ dnorm(yClairNBS3Mean[jp], yClairNBS3Prec)
}

# MONTH BY MONTH CHANGE IN STORAGE ANALYSIS
for(jp in posteriorStartMonth:posteriorEndMonth){
    ySuperiorDStorePP[jp] ~ dnorm(superiorDStore[jp], ySuperiorRStorePrec)

    superiorDStore[jp] <- (
        superiorPrecip[jp]
        -superiorEvap[jp]
        +superiorRunoff[jp]
        -superiorOutflowPP_mm[jp]
        +superiorDiversionPP_mm[jp]
        +superiorProcError[m[jp]]
    )

    superiorOutflowPP_mm[jp] <-
    superiorOutflow[jp]/supArea*1000*secondsInADay*dayVector[jp]
    superiorDiversionPP_mm[jp] <-
    superiorDiversion[jp]/supArea*1000*secondsInADay*dayVector[jp]

    yMiHuronDStorePP[jp] ~ dnorm(miHuronDStore[jp], yMiHuronRStorePrec)

    miHuronDStore[jp] <- (
        miHuronPrecip[jp]
        -miHuronEvap[jp]
        +miHuronRunoff[jp]
        +miHuronInflowPP_mm[jp]
        -miHuronOutflowPP_mm[jp]
        -miHuronDiversionPP_mm[jp]
        +miHuronProcError[m[jp]]
    )

    miHuronOutflowPP_mm[jp] <-
    miHuronOutflow[jp]/mhgArea*1000*secondsInADay*dayVector[jp]
    miHuronInflowPP_mm[jp] <-
    superiorOutflow[jp]/mhgArea*1000*secondsInADay*dayVector[jp]
    miHuronDiversionPP_mm[jp] <-
    miHuronDiversion[jp]/mhgArea*1000*secondsInADay*dayVector[jp]
```

```
    yClairDStorePP[jp] ~ dnorm(clairDStore[jp], yClairRStorePrec);

    clairDStore[jp] <- (
        clairNBS[jp]
        + miHuronOutflow[jp]
        - clairOutflow[jp]
        + clairProcError[m[jp]]
    )

    yErieDStorePP[jp] ~ dnorm(erieDStore[jp], yErieRStorePrec)

    erieDStore[jp] <- (
        eriePrecip[jp]
        -erieEvap[jp]
        +erieRunoff[jp]
        -erieOutflowPP_mm[jp]
        # DETROIT RIVER
        +erieInflowPP_mm[jp]
        # WELLAND CANAL
        -erieDiversionPP_mm[jp]
        +erieProcError[m[jp]]
    )

    erieOutflowPP_mm[jp] <-
    erieOutflow[jp]/eriArea*1000*secondsInADay*dayVector[jp]
    erieInflowPP_mm[jp] <-
    clairOutflow[jp]/eriArea*1000*secondsInADay*dayVector[jp]
    erieDiversionPP_mm[jp] <-
    erieDiversion[jp]/eriArea*1000*secondsInADay*dayVector[jp]

    ### ONTARIO
    yOntarioDStorePP[jp] ~ dnorm(ontarioDStore[jp], yOntarioRStorePrec)

    ontarioDStore[jp] <- (
        ontarioPrecip[jp]
        -ontarioEvap[jp]
        +ontarioRunoff[jp]
        -ontarioOutflowPP_mm[jp]
        +ontarioInflowPP_mm[jp]
        +ontarioProcError[m[jp]]
    )

    ontarioOutflowPP_mm[jp] <-
    ontarioOutflow[jp]/ontArea*1000*secondsInADay*dayVector[jp]
    ontarioInflowPP_mm[jp] <-
    erieOutflow[jp]/ontArea*1000*secondsInADay*dayVector[jp] +
    erieDiversion[jp]/ontArea*1000*secondsInADay*dayVector[jp]
}
```

```
### CUMULATIVE STORAGE ANALYSIS

# 12 MONTHS

for(x in 12:posteriorEndMonth){
    ySuperiorR1YStorePP[x] ~ dnorm(superiorR1YStore[x],
    ySuperiorRStorePrec)

    superiorR1YStore[x] <- (
        sum(superiorPrecip[(x-12+1):x])
        -sum(superiorEvap[(x-12+1):x])
        +sum(superiorRunoff[(x-12+1):x])
        -superiorOutflowPPR1_mm[x]
        +superiorDiversionPPR1_mm[x]
        +sum(superiorProcError[m[(x-12+1):x]])
    )

    superiorOutflowPPR1_mm[x] <- sum(superiorOutflow[(x-
    12+1):x]/supArea*1000*secondsInADay*dayVector[(x-12+1):x])
    superiorDiversionPPR1_mm[x] <- sum(superiorDiversion[(x-
    12+1):x]/supArea*1000*secondsInADay*dayVector[(x-12+1):x])

    yMiHuronR1YStorePP[x] ~ dnorm(miHuronR1YStore[x], yMiHuronRStorePrec)

    miHuronR1YStore[x] <- (
        sum(miHuronPrecip[(x-12+1):x])
        -sum(miHuronEvap[(x-12+1):x])
        +sum(miHuronRunoff[(x-12+1):x])
        +miHuronInflowPPR1_mm[x]
        -miHuronOutflowPPR1_mm[x]
        -miHuronDiversionPPR1_mm[x]
        +sum(miHuronProcError[m[(x-12+1):x]])
    )

    miHuronOutflowPPR1_mm[x] <- sum(miHuronOutflow[(x-
    12+1):x]/mhgArea*1000*secondsInADay*dayVector[(x-12+1):x])
    miHuronInflowPPR1_mm[x] <- sum(superiorOutflow[(x-
    12+1):x]/mhgArea*1000*secondsInADay*dayVector[(x-12+1):x])
    miHuronDiversionPPR1_mm[x] <- sum(miHuronDiversion[(x-
    12+1):x]/mhgArea*1000*secondsInADay*dayVector[(x-12+1):x])

    yClairR1YStorePP[x] ~ dnorm(clairR1YStore[x], yClairRStorePrec);

    clairR1YStore[x] <- (
        sum(clairNBS[(x-12+1):x])
        + sum(miHuronOutflow[(x-12+1):x])
        - sum(clairOutflow[(x-12+1):x])
        + sum(clairProcError[m[(x-12+1):x]])
    )
```

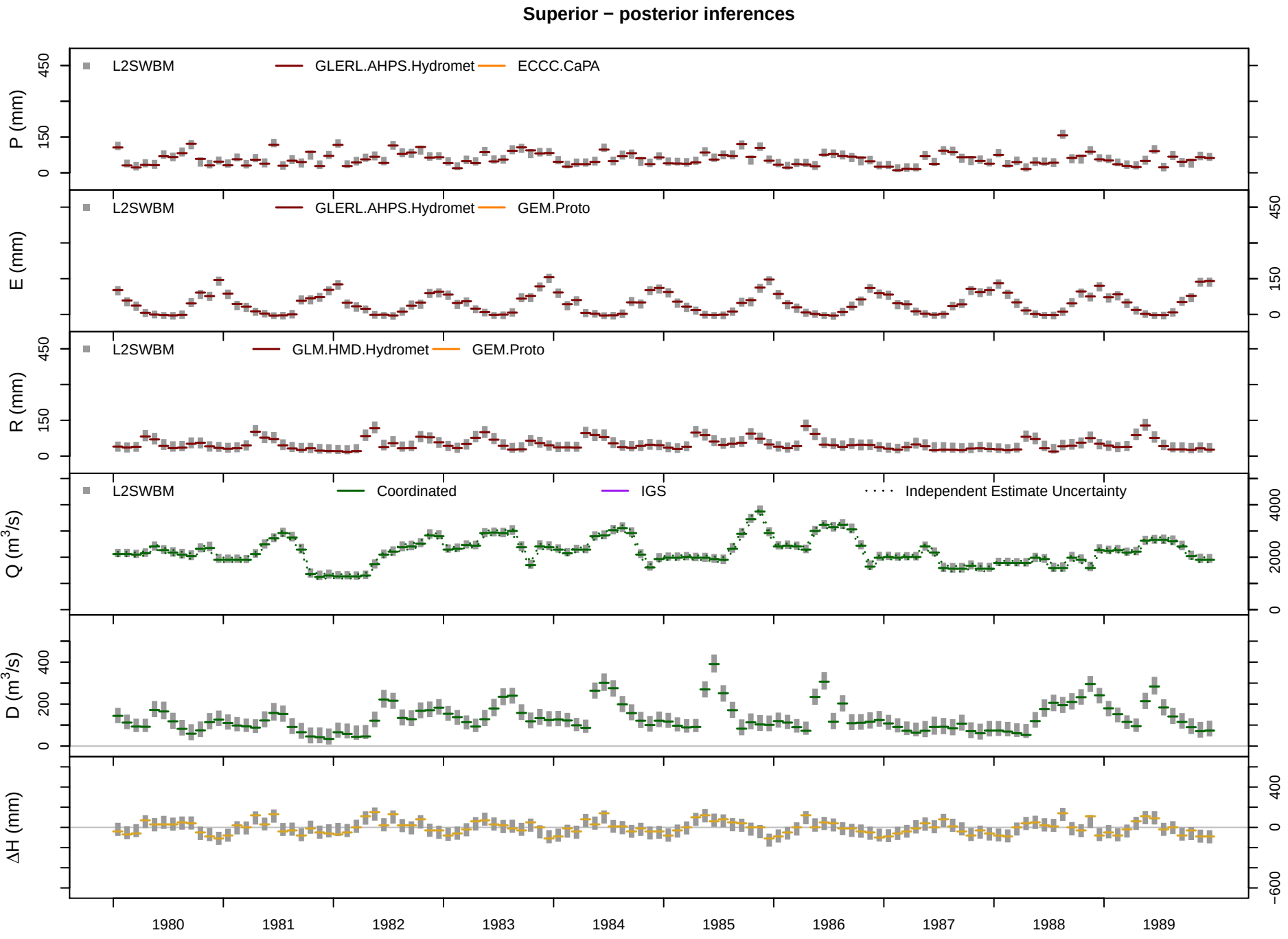
```
    yErieR1YStorePP[x] ~ dnorm(erieR1YStore[x], yErieRStorePrec)

    erieR1YStore[x] <- (
        sum(eriePrecip[(x-12+1):x])
        -sum(erieEvap[(x-12+1):x])
        +sum(erieRunoff[(x-12+1):x])
        -erieOutflowPPR1_mm[x]
        # DETROIT RIVER
        +erieInflowPPR1_mm[x]
        # WELLAND CANAL
        -erieDiversionPPR1_mm[x]
        +sum(erieProcError[m[(x-12+1):x]])
    )

    erieOutflowPPR1_mm[x] <- sum(erieOutflow[(x-
    12+1):x]/eriArea*1000*secondsInADay*dayVector[(x-12+1):x])
    erieInflowPPR1_mm[x] <- sum(clairOutflow[(x-
    12+1):x]/eriArea*1000*secondsInADay*dayVector[(x-12+1):x])
    erieDiversionPPR1_mm[x] <- sum(erieDiversion[(x-
    12+1):x]/eriArea*1000*secondsInADay*dayVector[(x-12+1):x])

    ### ONTARIO
    yOntarioR1YStorePP[x] ~ dnorm(ontarioR1YStore[x], yOntarioRStorePrec)

    ontarioR1YStore[x] <- (
        sum(ontarioPrecip[(x-12+1):x])
        -sum(ontarioEvap[(x-12+1):x])
        +sum(ontarioRunoff[(x-12+1):x])
        -ontarioOutflowPPR1_mm[x]
        +ontarioInflowPPR1_mm[x]
        +sum(ontarioProcError[m[(x-12+1):x]])
    )

    ontarioOutflowPPR1_mm[x] <- sum(ontarioOutflow[(x-
    12+1):x]/ontArea*1000*secondsInADay*dayVector[(x-12+1):x])

    ontarioInflowPPR1_mm[x] <- sum(erieOutflow[(x-
    12+1):x]/ontArea*1000*secondsInADay*dayVector[(x-12+1):x]) +
    sum(erieDiversion[(x-12+1):x]/ontArea*1000*secondsInADay*dayVector[(x-
    12+1):x])
}
```

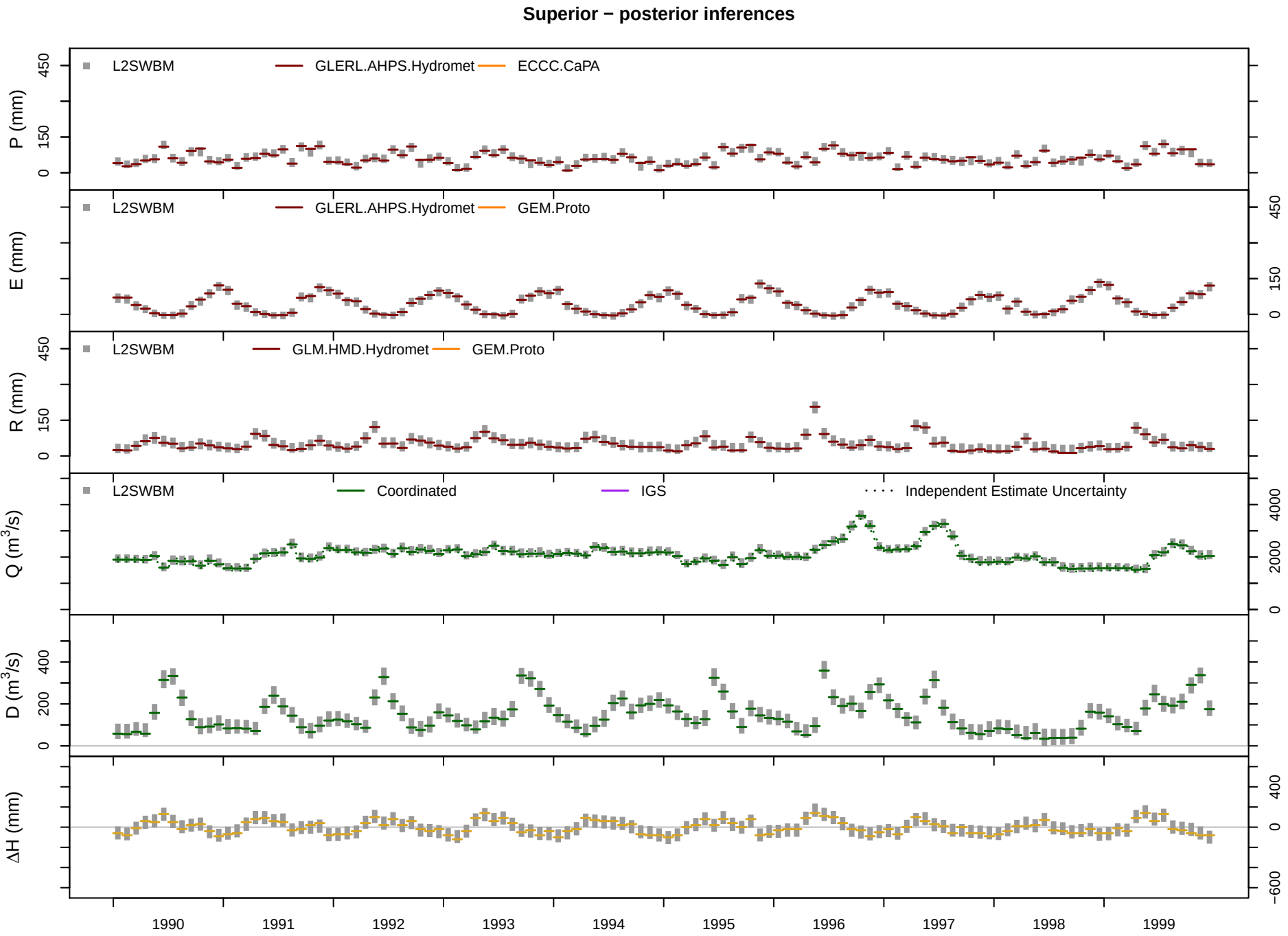
```
# 60 MONTHS

for(z in 60:posteriorEndMonth){
    ySuperiorR5YStorePP[z] ~ dnorm(superiorR5YStore[z],
    ySuperiorRStorePrec)

    superiorR5YStore[z] <- (
        sum(superiorPrecip[(z-60+1):z])
        -sum(superiorEvap[(z-60+1):z])
        +sum(superiorRunoff[(z-60+1):z])
        -superiorOutflowPPR5_mm[z]
        +superiorDiversionPPR5_mm[z]
        +sum(superiorProcError[m[(z-60+1):z]])
    )

    superiorOutflowPPR5_mm[z] <- sum(superiorOutflow[(z-
    60+1):z]/supArea*1000*secondsInADay*dayVector[(z-60+1):z])
    superiorDiversionPPR5_mm[z] <- sum(superiorDiversion[(z-
    60+1):z]/supArea*1000*secondsInADay*dayVector[(z-60+1):z])

    yMiHuronR5YStorePP[z] ~ dnorm(miHuronR5YStore[z], yMiHuronRStorePrec)

    miHuronR5YStore[z] <- (
        sum(miHuronPrecip[(z-60+1):z])
        -sum(miHuronEvap[(z-60+1):z])
        +sum(miHuronRunoff[(z-60+1):z])
        +miHuronInflowPPR5_mm[z]
        -miHuronOutflowPPR5_mm[z]
        -miHuronDiversionPPR5_mm[z]
        +sum(miHuronProcError[m[(z-60+1):z]])
    )

    miHuronOutflowPPR5_mm[z] <- sum(miHuronOutflow[(z-
    60+1):z]/mhgArea*1000*secondsInADay*dayVector[(z-60+1):z])
    miHuronInflowPPR5_mm[z] <- sum(superiorOutflow[(z-
    60+1):z]/mhgArea*1000*secondsInADay*dayVector[(z-60+1):z])
    miHuronDiversionPPR5_mm[z] <- sum(miHuronDiversion[(z-
    60+1):z]/mhgArea*1000*secondsInADay*dayVector[(z-60+1):z])

    yClairR5YStorePP[z] ~ dnorm(clairR5YStore[z], yClairRStorePrec);

    clairR5YStore[z] <- (
        sum(clairNBS[(z-60+1):z])
        + sum(miHuronOutflow[(z-60+1):z])
        - sum(clairOutflow[(z-60+1):z])
        + sum(clairProcError[m[(z-60+1):z]])
    )
```

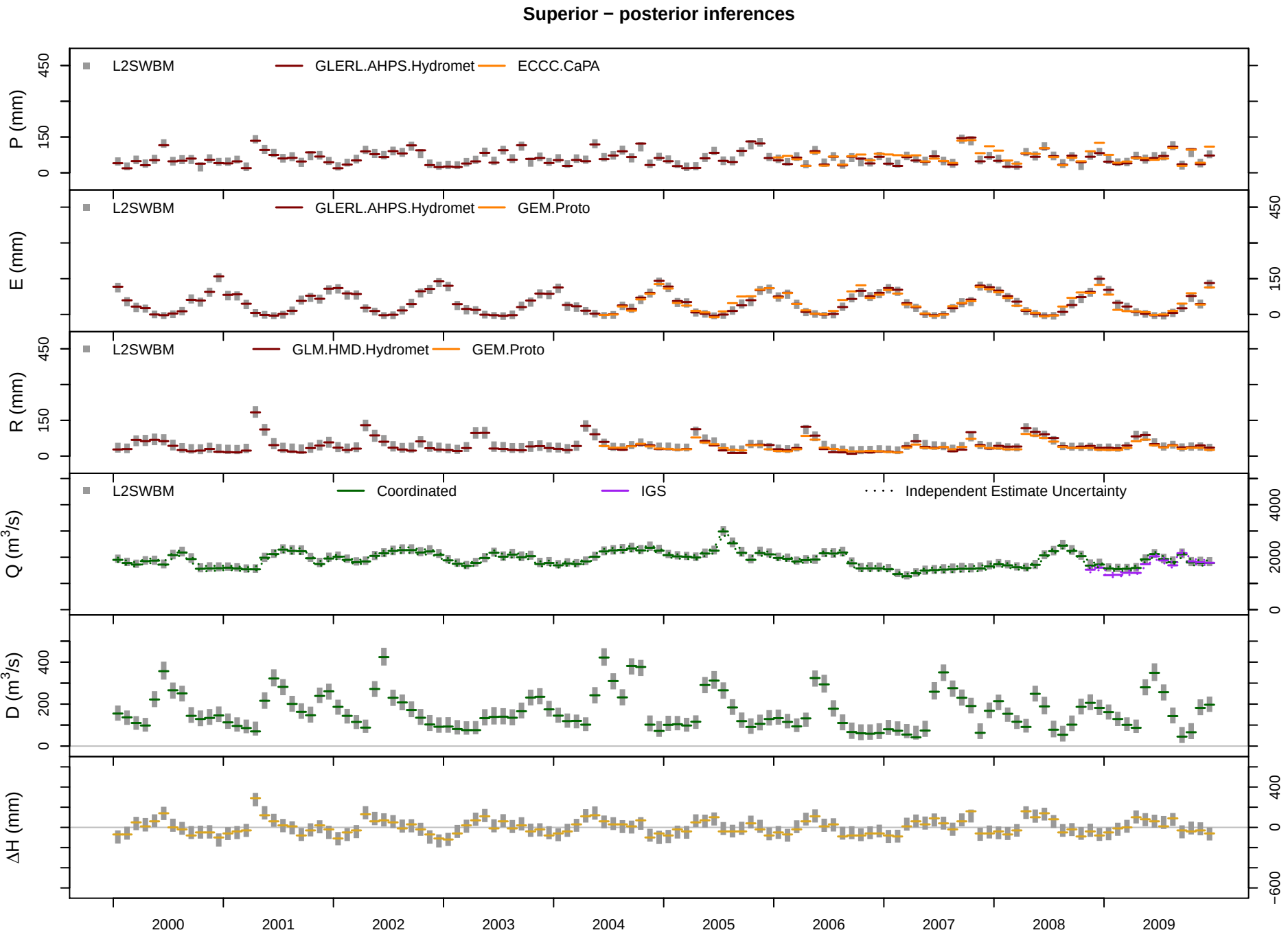
```
        yErieR5YStorePP[z] ~ dnorm(erieR5YStore[z], yErieRStorePrec)

        erieR5YStore[z] <- (
            sum(eriePrecip[(z-60+1):z])
            -sum(erieEvap[(z-60+1):z])
            +sum(erieRunoff[(z-60+1):z])
            -erieOutflowPPR5_mm[z]
            # DETROIT RIVER
            +erieInflowPPR5_mm[z]
            # WELLAND CANAL
            -erieDiversionPPR5_mm[z]
            +sum(erieProcError[m[(z-60+1):z]])
        )

        erieOutflowPPR5_mm[z] <- sum(erieOutflow[(z-
        60+1):z]/eriArea*1000*secondsInADay*dayVector[(z-60+1):z])
        erieInflowPPR5_mm[z] <- sum(clairOutflow[(z-
        60+1):z]/eriArea*1000*secondsInADay*dayVector[(z-60+1):z])
        erieDiversionPPR5_mm[z] <- sum(erieDiversion[(z-
        60+1):z]/eriArea*1000*secondsInADay*dayVector[(z-60+1):z])

        ### ONTARIO
        yOntarioR5YStorePP[z] ~ dnorm(ontarioR5YStore[z], yOntarioRStorePrec)

        ontarioR5YStore[z] <- (
            sum(ontarioPrecip[(z-60+1):z])
            -sum(ontarioEvap[(z-60+1):z])
            +sum(ontarioRunoff[(z-60+1):z])
            -ontarioOutflowPPR5_mm[z]
            +ontarioInflowPPR5_mm[z]
            +sum(ontarioProcError[m[(z-60+1):z]])
        )

        ontarioOutflowPPR5_mm[z] <- sum(ontarioOutflow[(z-
        60+1):z]/ontArea*1000*secondsInADay*dayVector[(z-60+1):z])
        ontarioInflowPPR5_mm[z] <- sum(erieOutflow[(z-
        60+1):z]/ontArea*1000*secondsInADay*dayVector[(z-60+1):z]) +
        sum(erieDiversion[(z-60+1):z]/ontArea*1000*secondsInADay*dayVector[(z-
        60+1):z])
    }

}
```

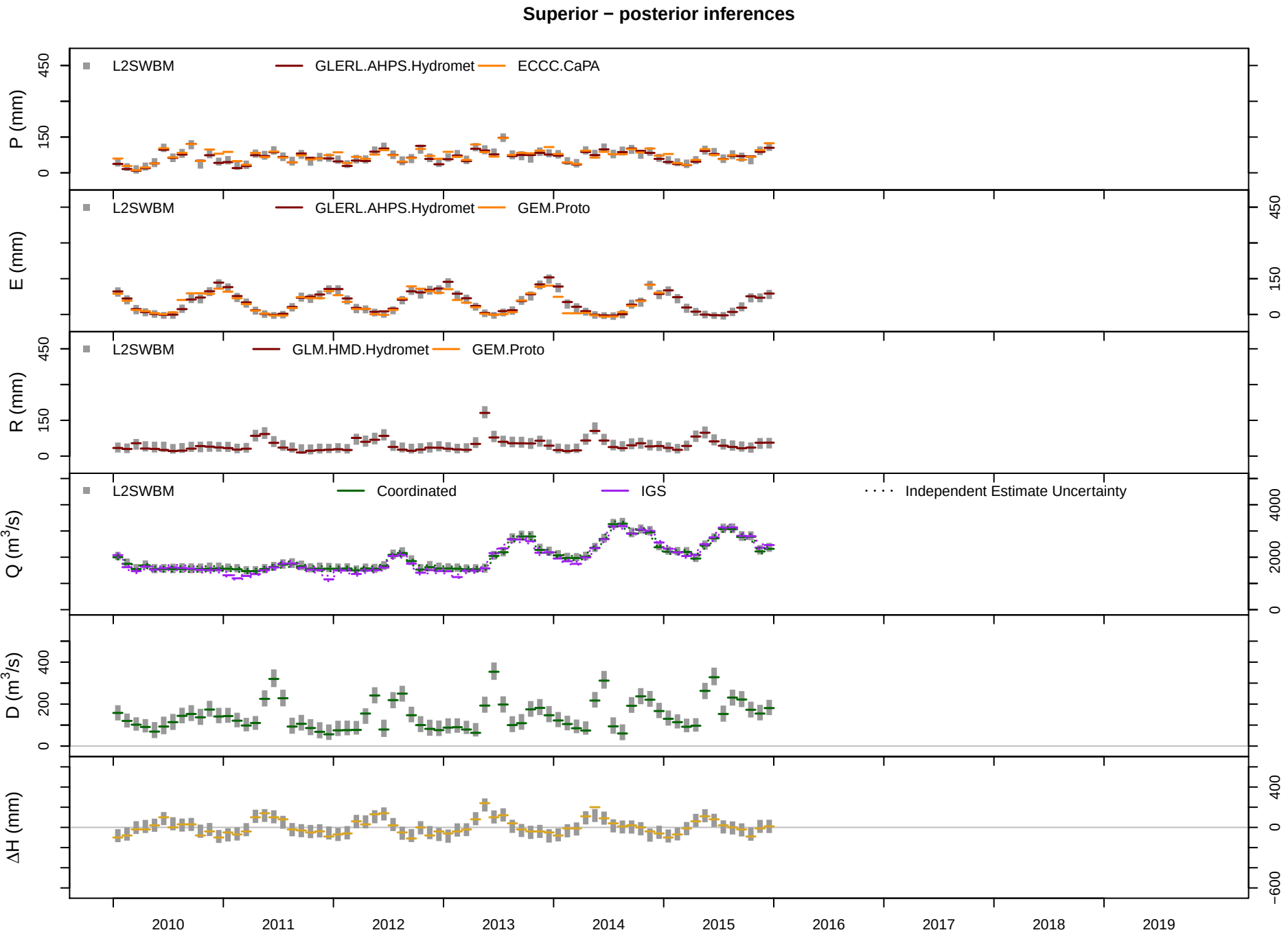
HISTORICAL DATA AND NEW WATER BALANCE COMPONENTS:

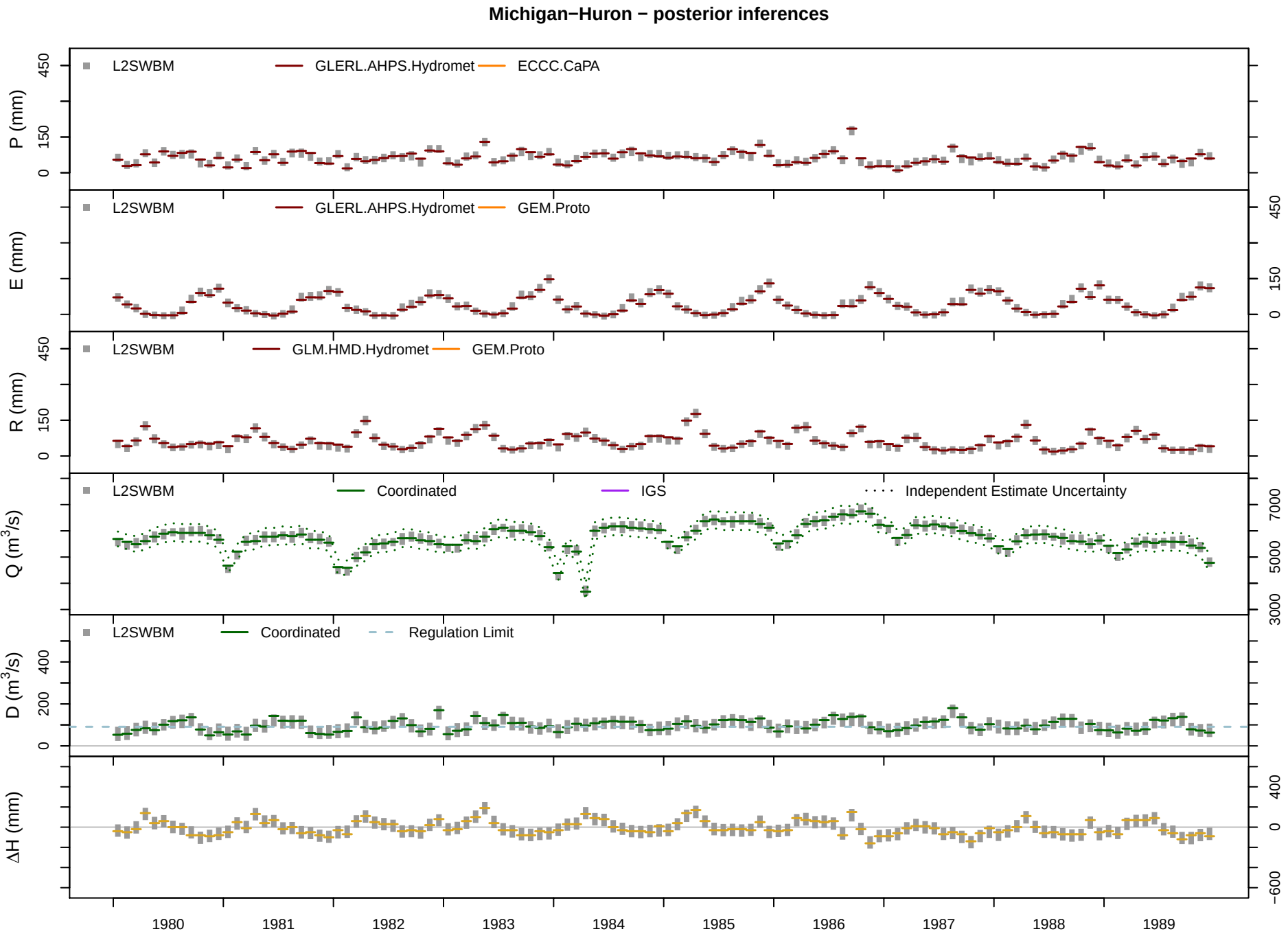
L2SWBM CONFIGURATION WITH 1-MONTH ROLLING WINDOW

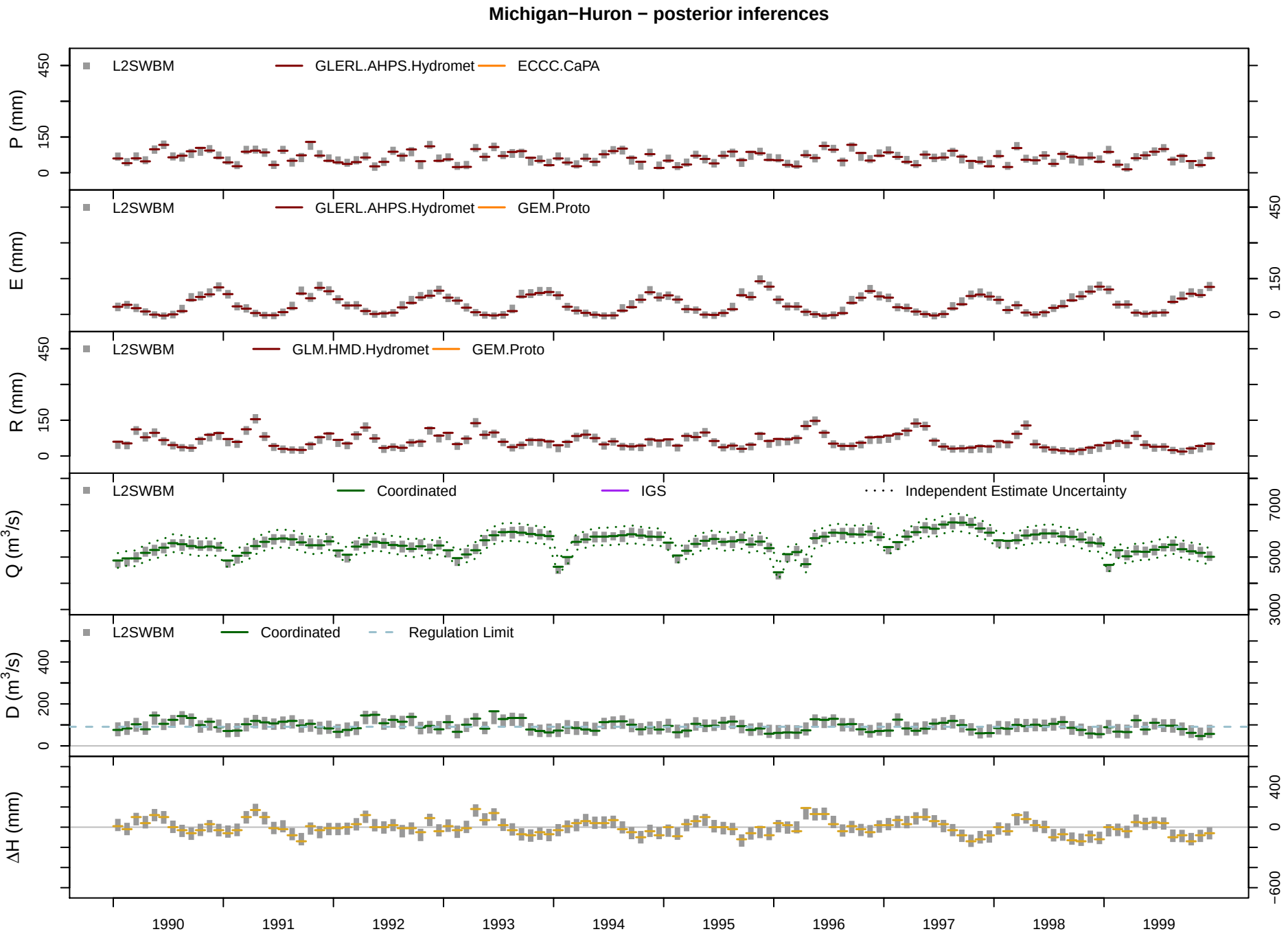

Superior − posterior inferences
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
P (mm)
GEM.Proto
E (mm)
GLM.HMD.Hydromet
R (mm)
Coordinated
IGS
Independent Estimate Uncertainty
Q (m3/s)
D (m3/s)
ΔH (mm)
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989

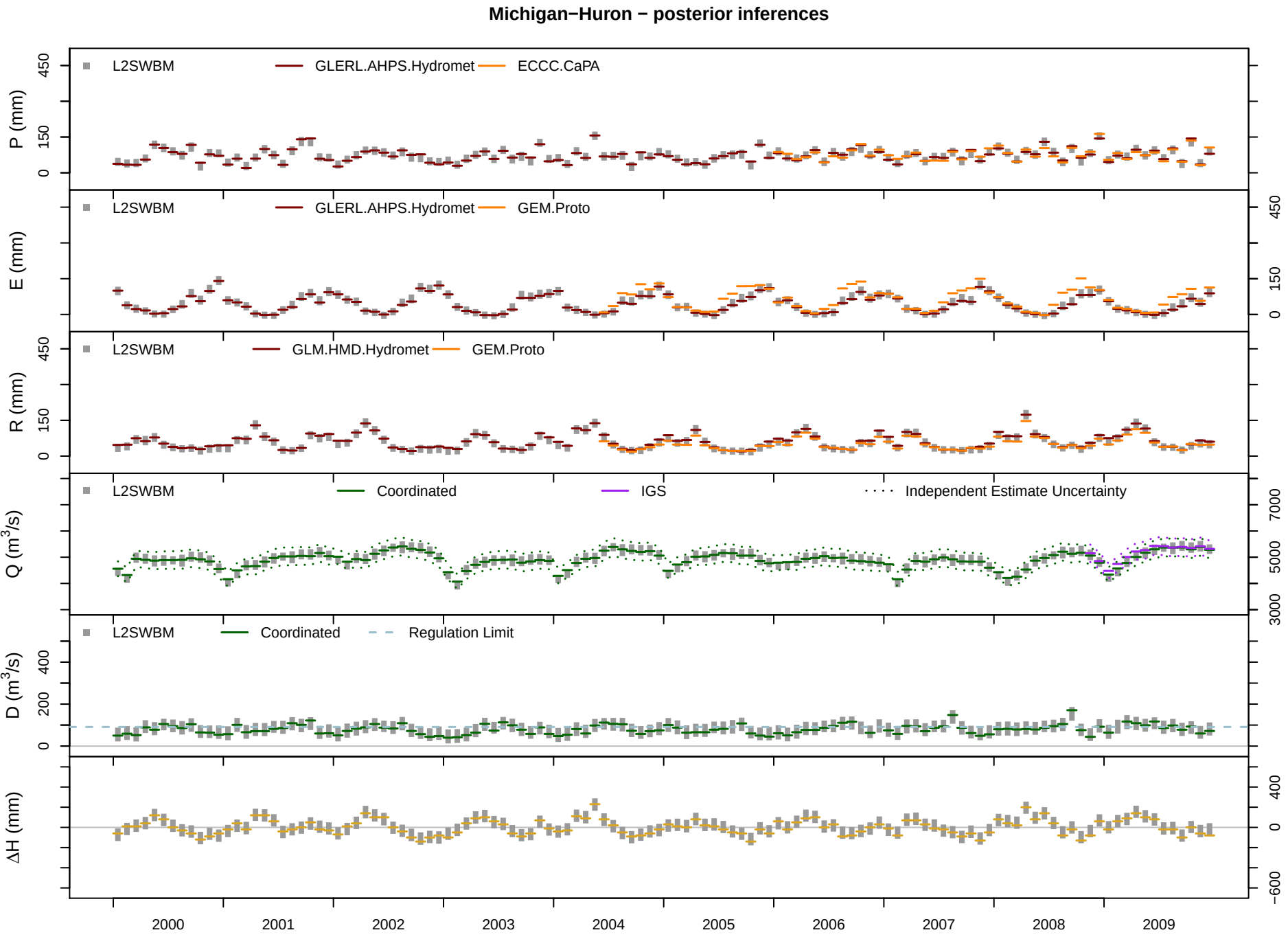

Superior − posterior inferences
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
P (mm)
GEM.Proto
E (mm)
GLM.HMD.Hydromet
R (mm)
Coordinated
IGS
Independent Estimate Uncertainty
Q (m3/s)
D (m3/s)
ΔH (mm)
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

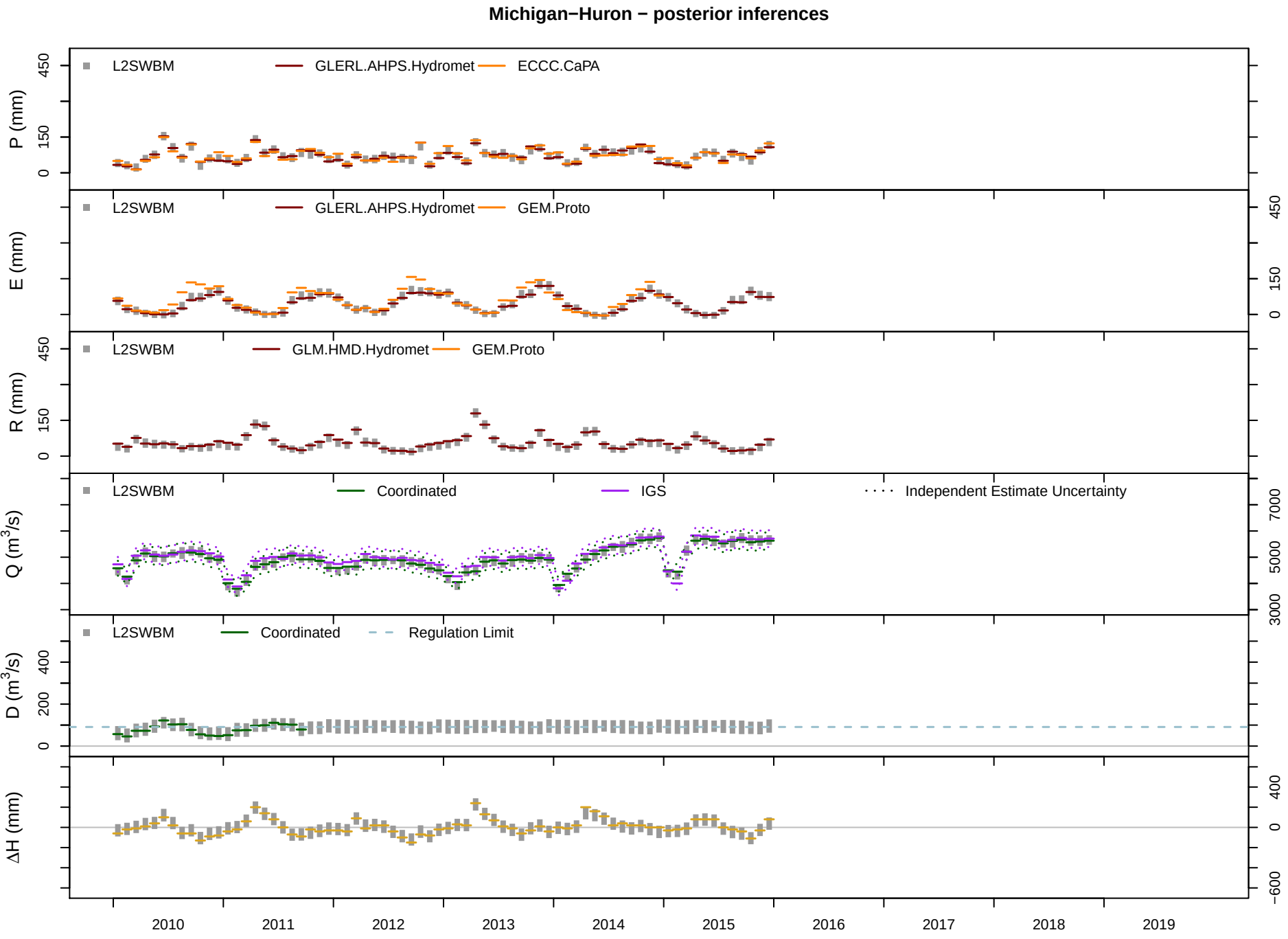

Superior − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
ΔH (mm)
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

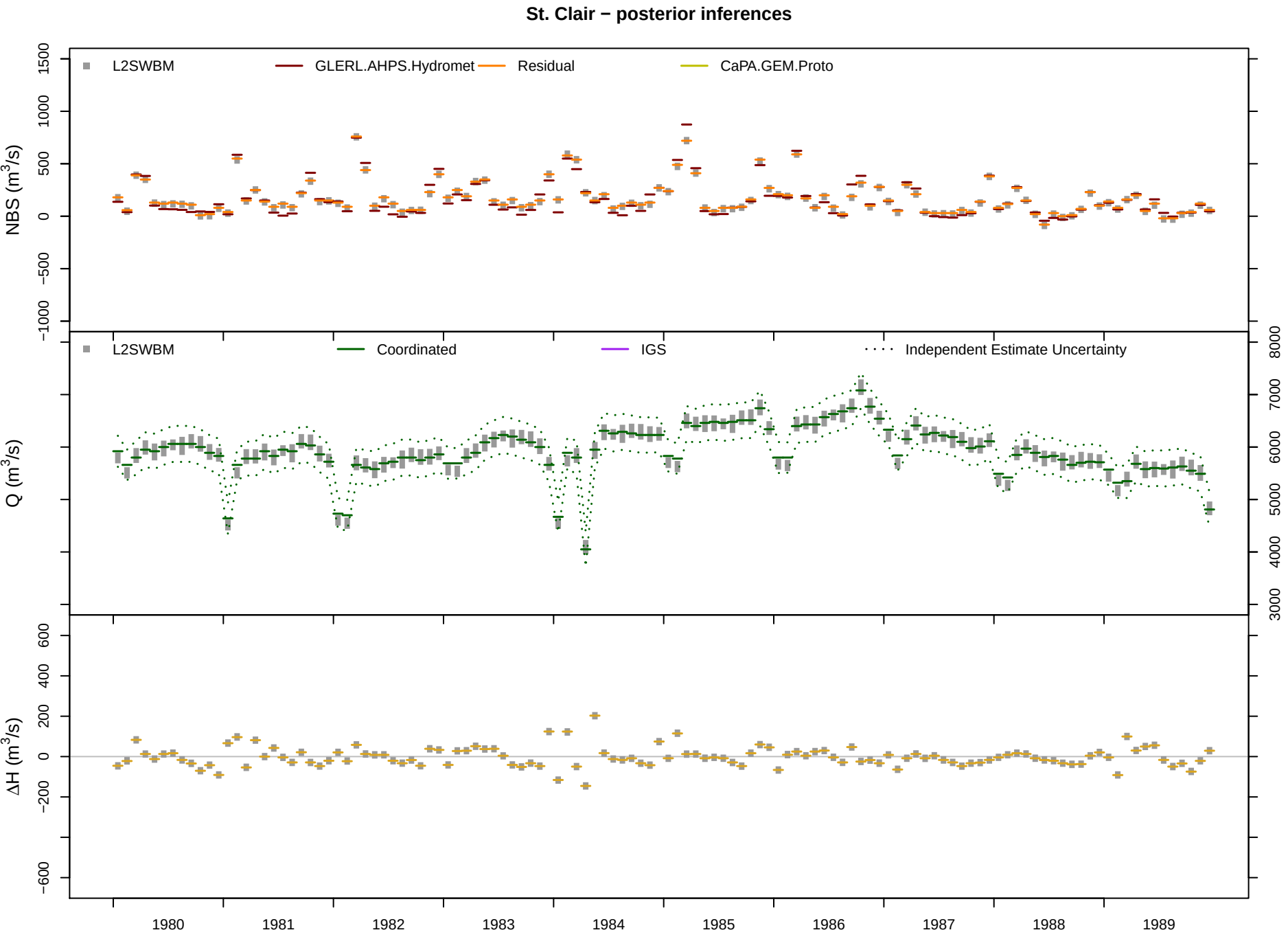

Superior − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
ΔH (mm)
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

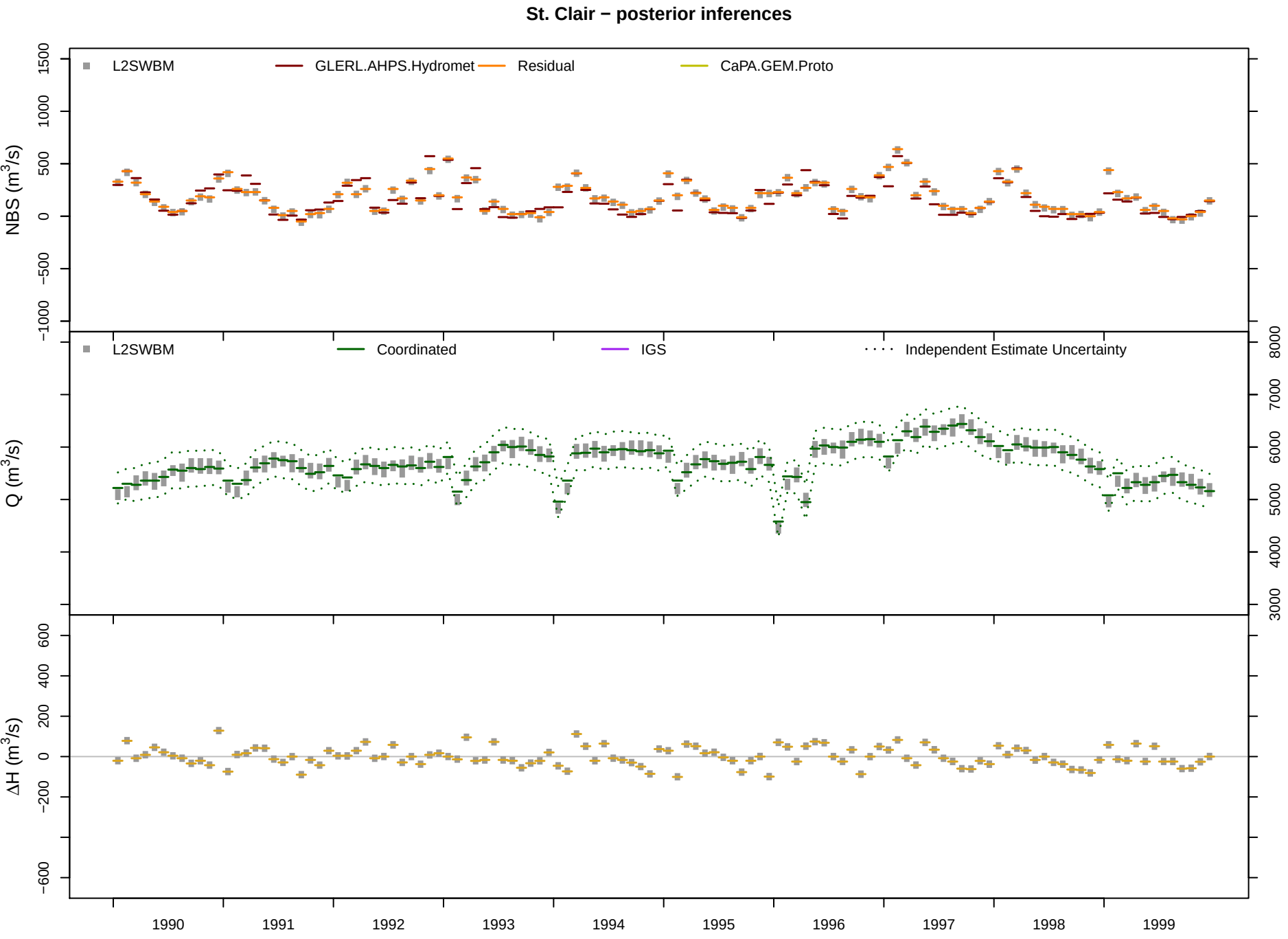

Michigan−Huron − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
L2SWBM
Coordinated
Regulation Limit
ΔH (mm)
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989


Michigan−Huron − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
L2SWBM
Coordinated
Regulation Limit
ΔH (mm)
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


Michigan−Huron − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
L2SWBM
Coordinated
Regulation Limit
ΔH (mm)
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


Michigan−Huron − posterior inferences
P (mm)
L2SWBM
GLERL.AHPS.Hydromet
ECCC.CaPA
E (mm)
L2SWBM
GLERL.AHPS.Hydromet
GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
L2SWBM
Coordinated
Regulation Limit
ΔH (mm)
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019


St. Clair − posterior inferences
L2SWBM
GLERL.AHPS.Hydromet
Residual
CaPA.GEM.Proto
NBS (m3/s)
1500
1000
500
0
−500
−1000
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
Q (m3/s)
8000
7000
6000
5000
4000
3000
ΔH (m3/s)
600
400
200
0
−200
−600
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989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Residual
CaPA.GEM.Proto
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L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
Q (m3/s)
8000
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ΔH (m3/s)
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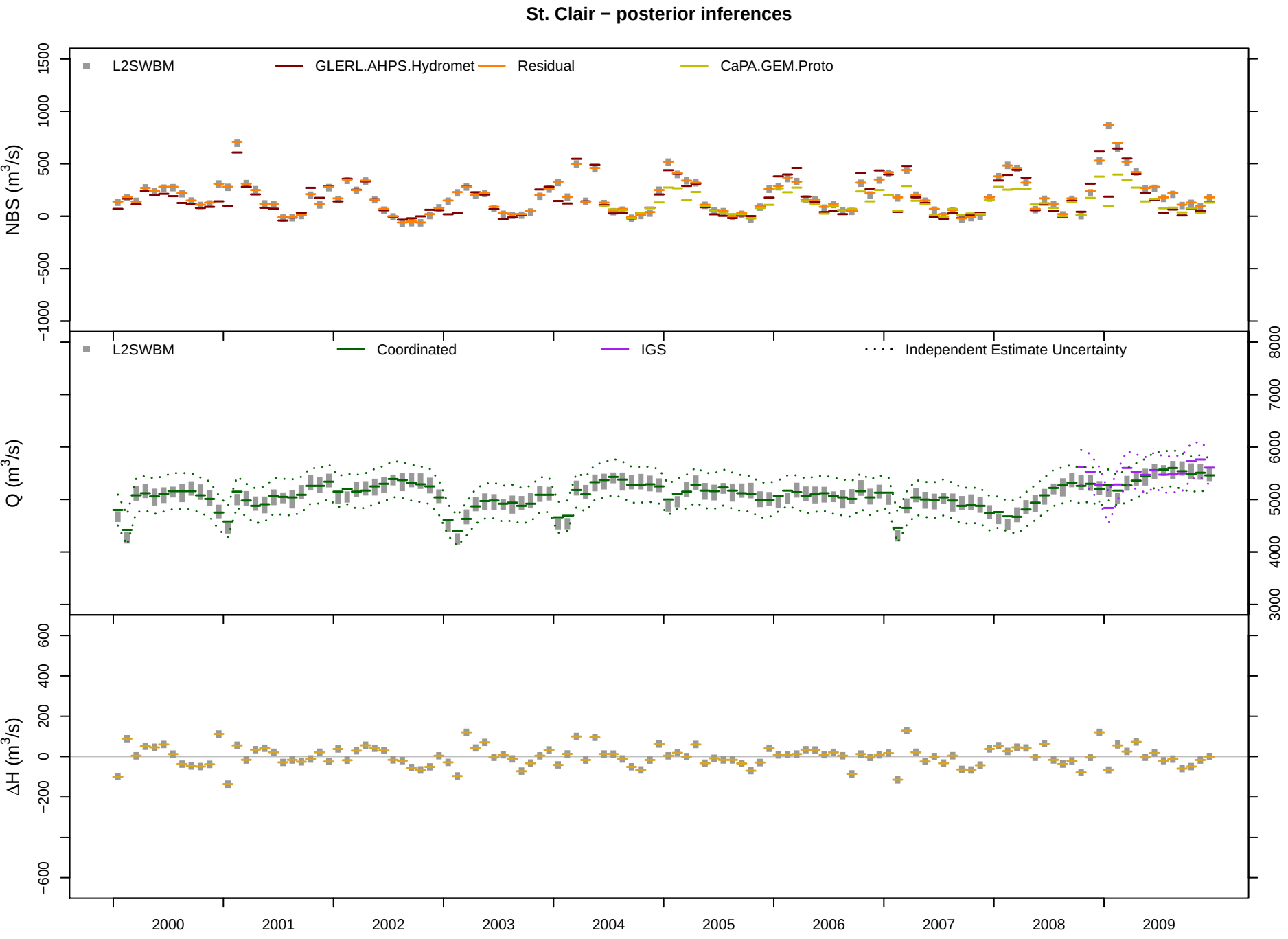
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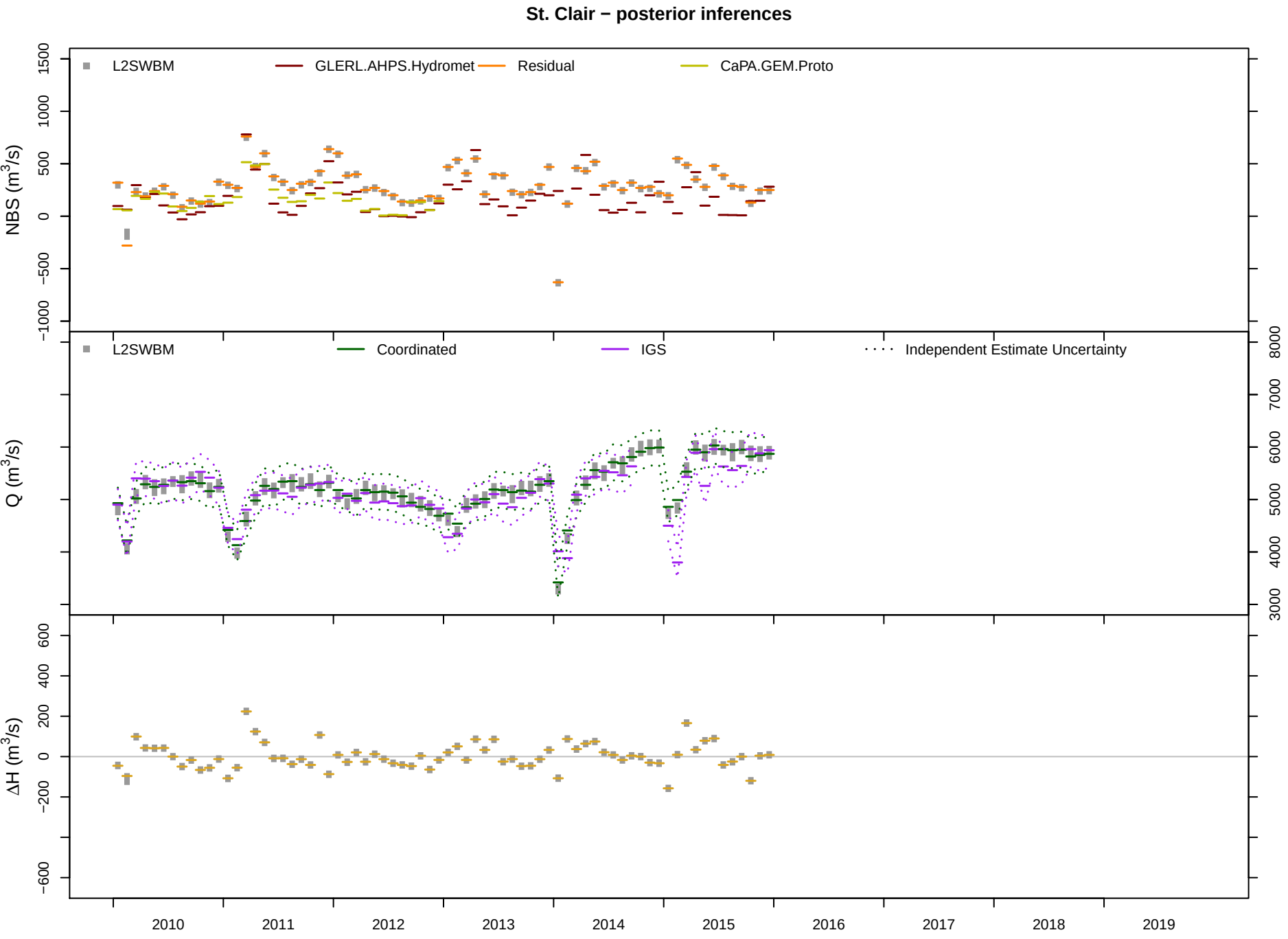
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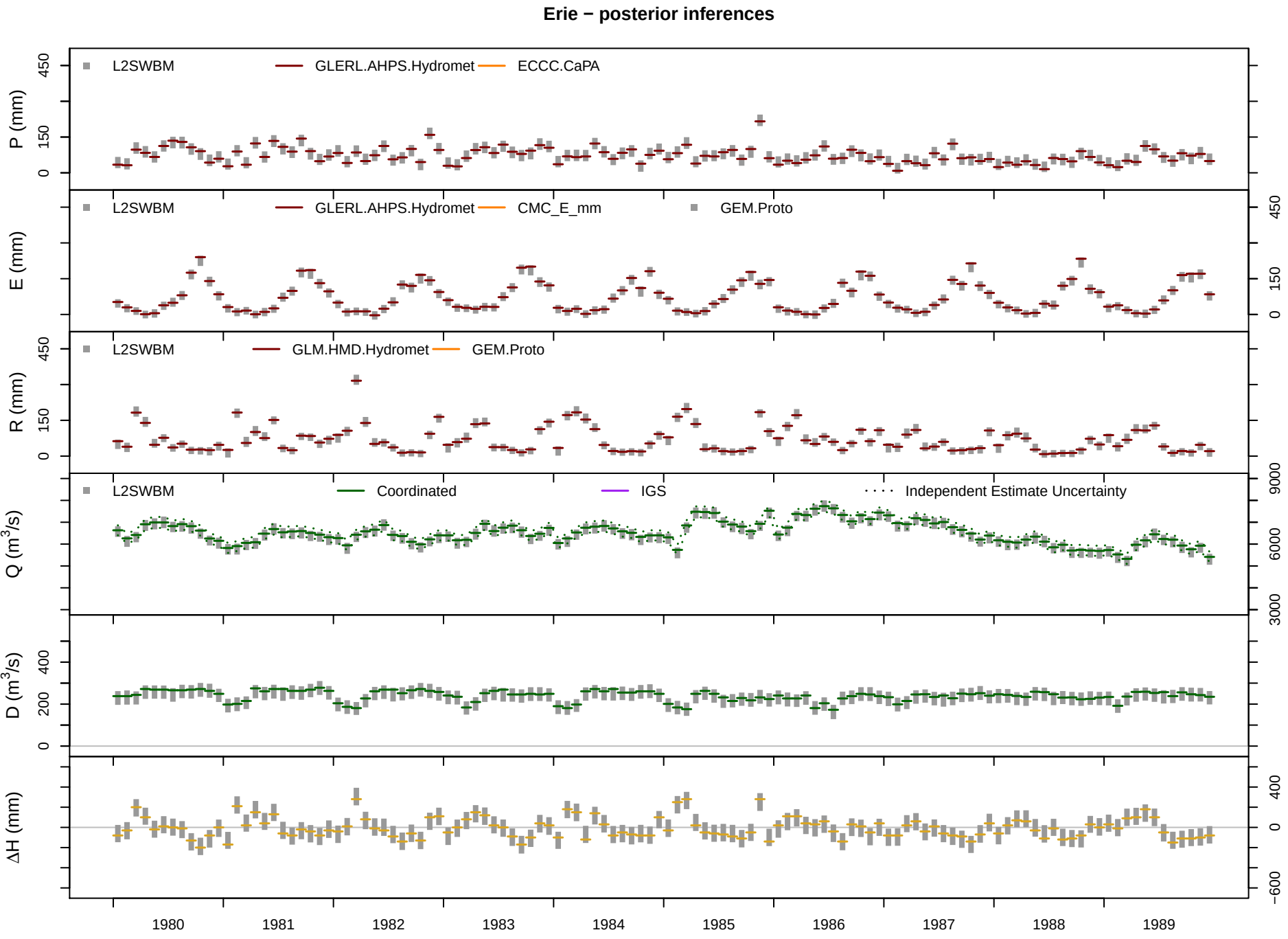
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ECCC.CaPA
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GEM.Proto
E (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
R (mm)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
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D (m3/s)
ΔH (mm)
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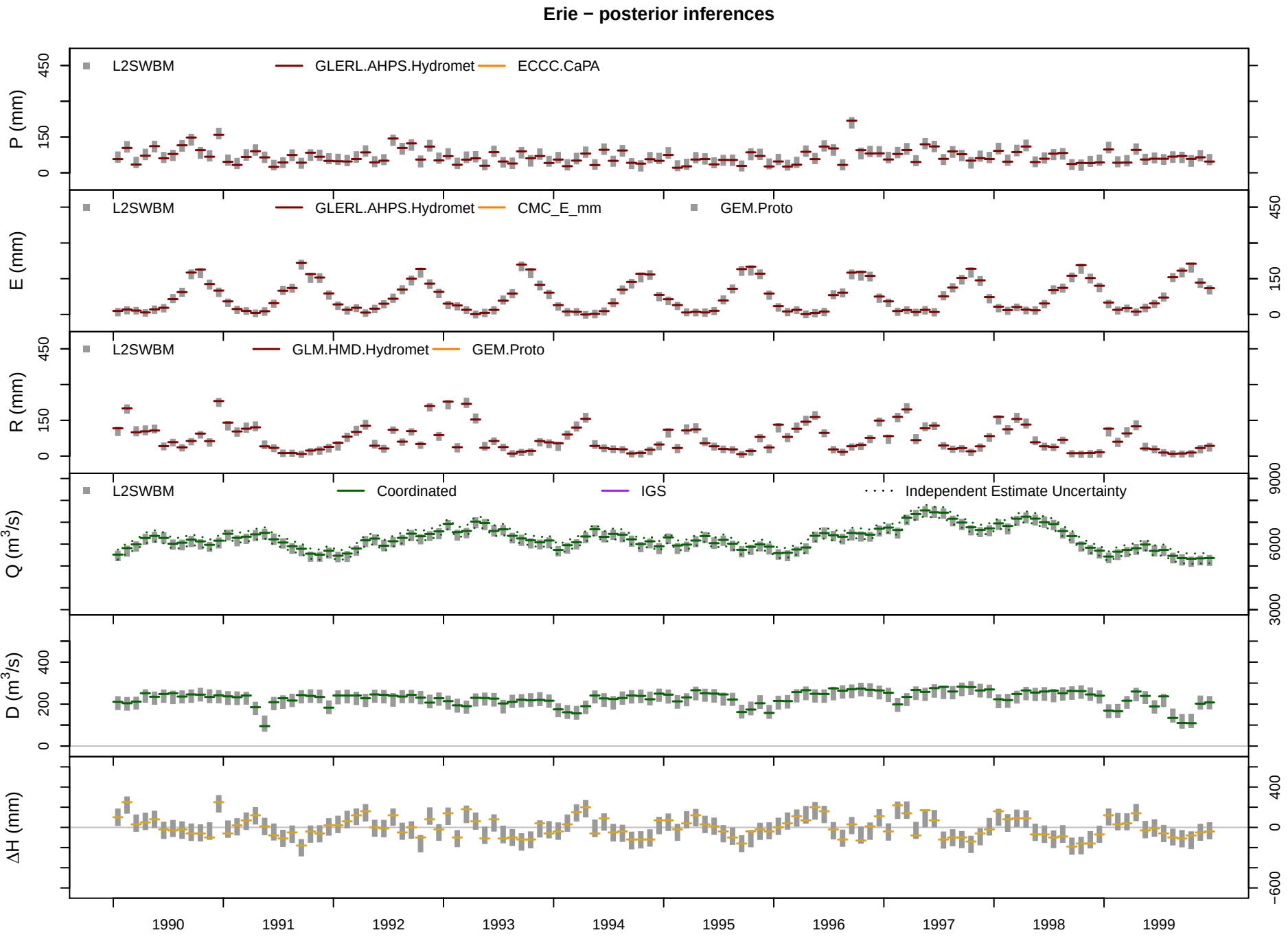
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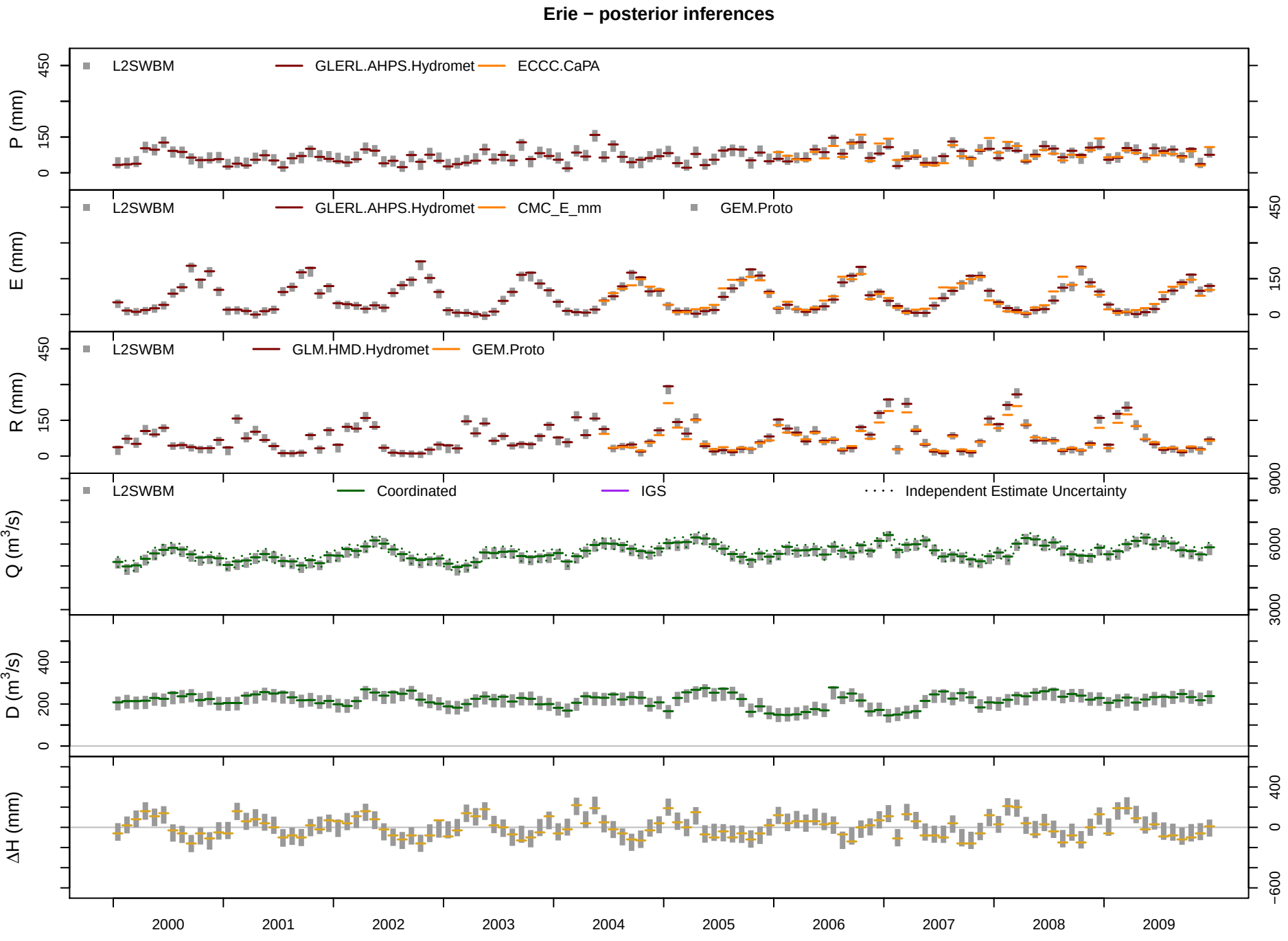
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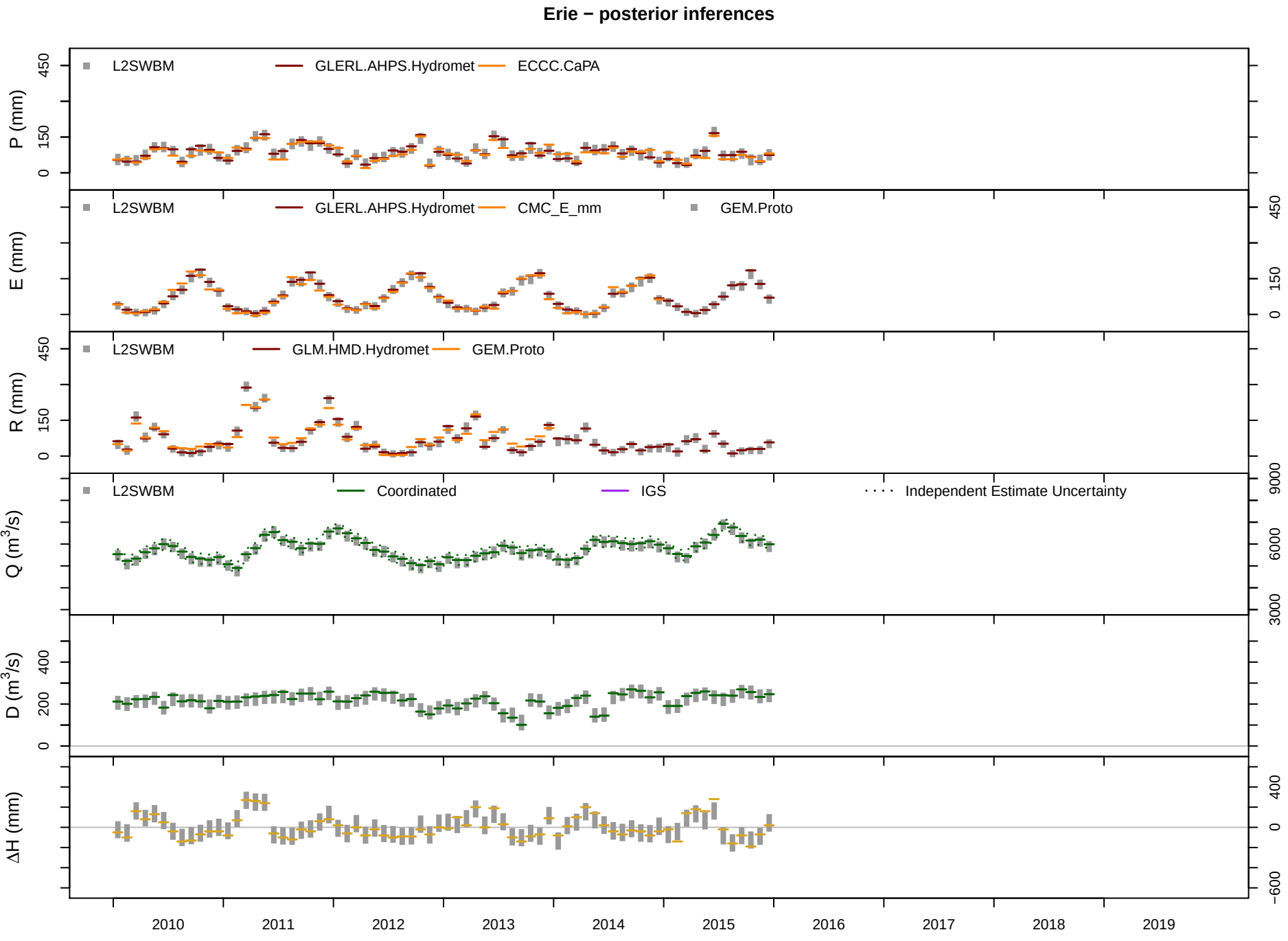
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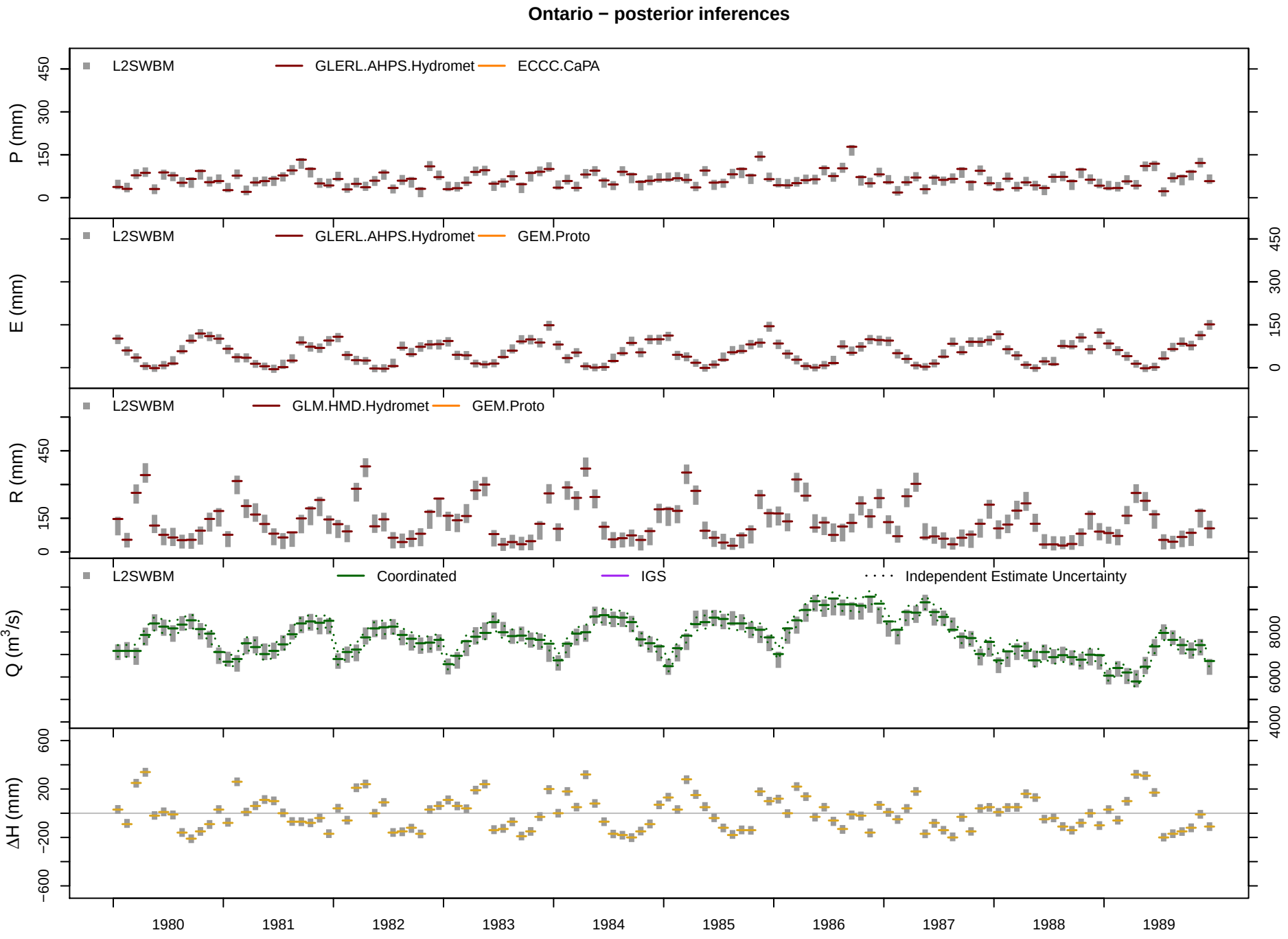
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GEM.Proto
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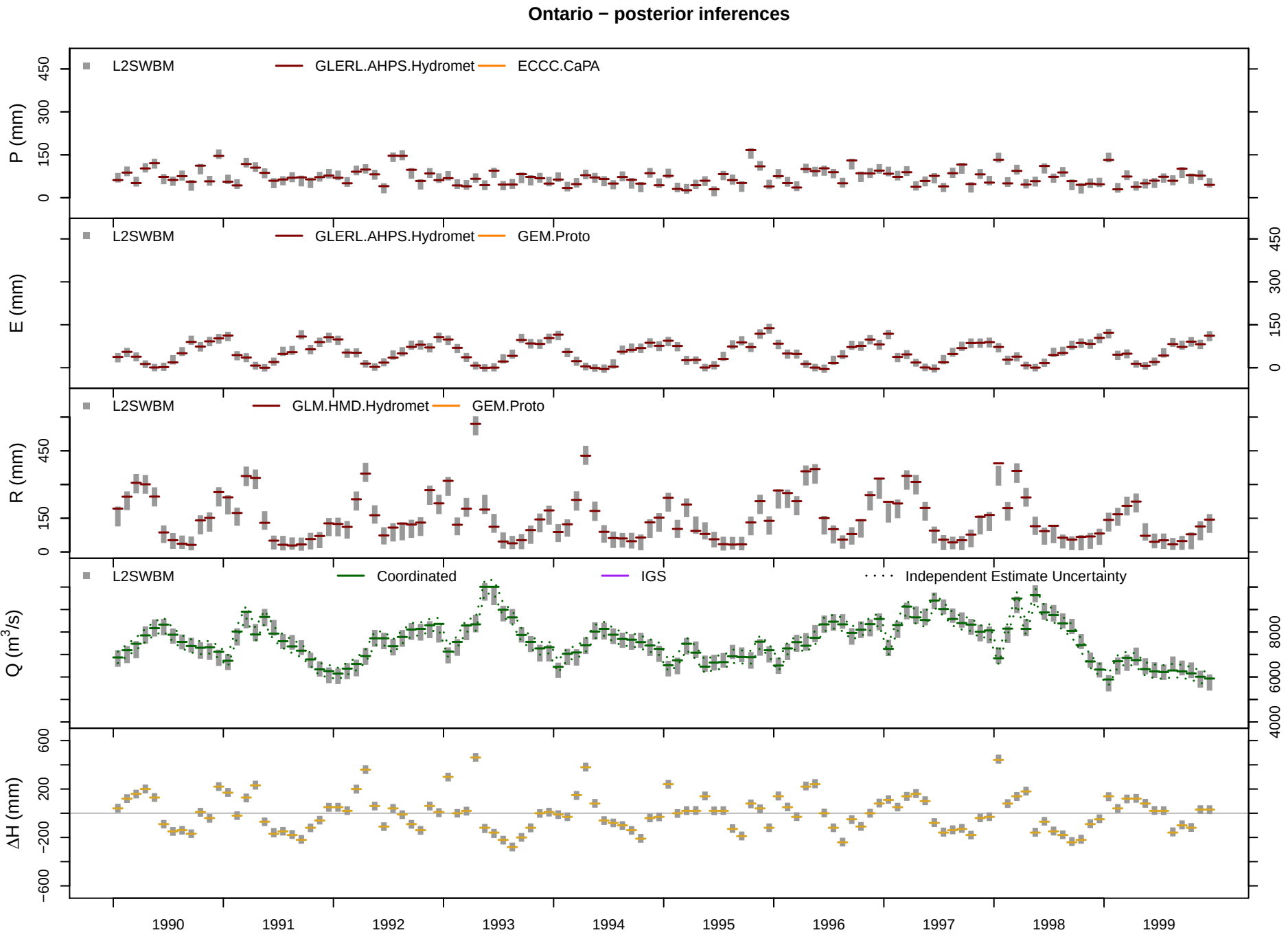
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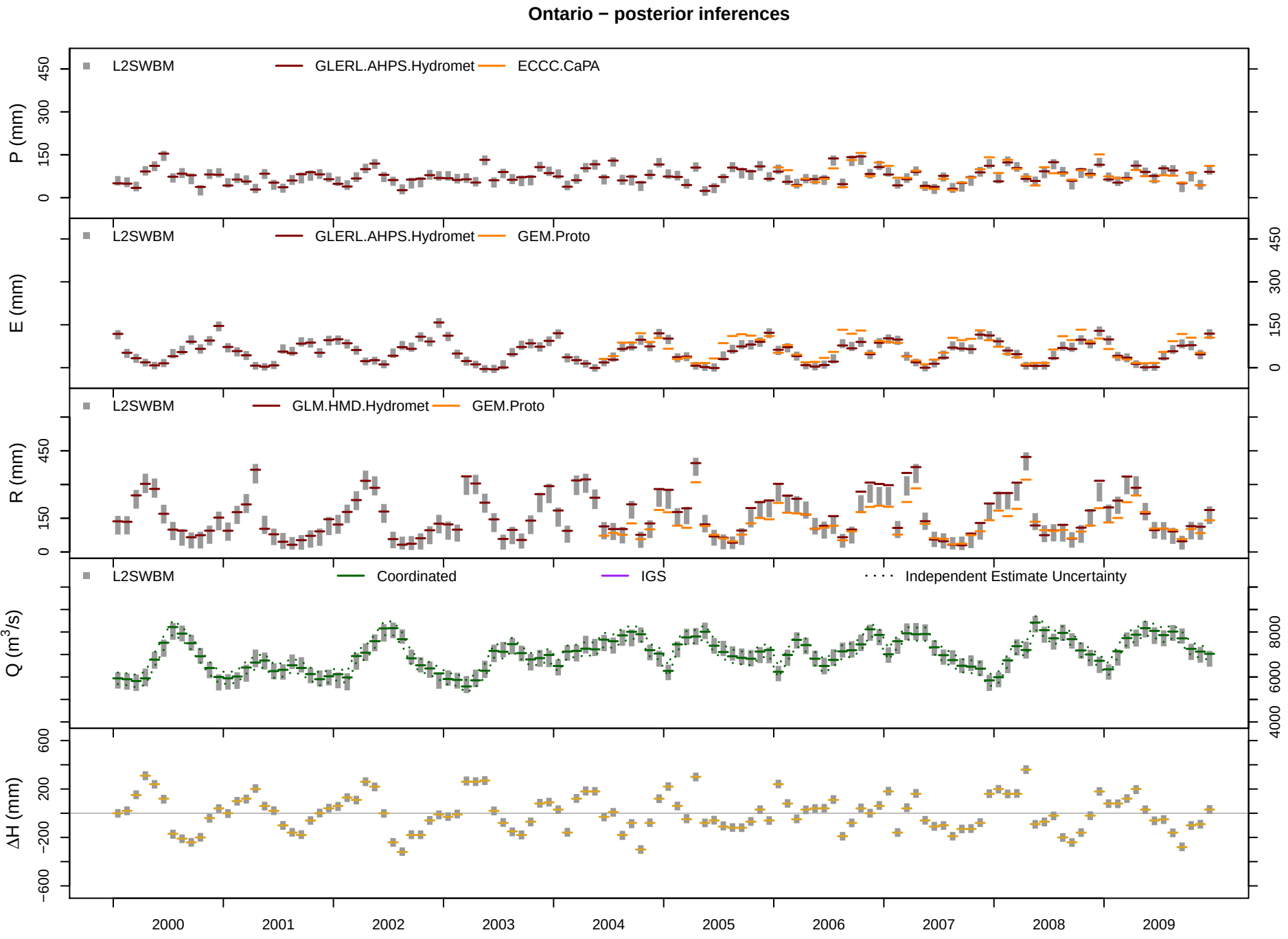
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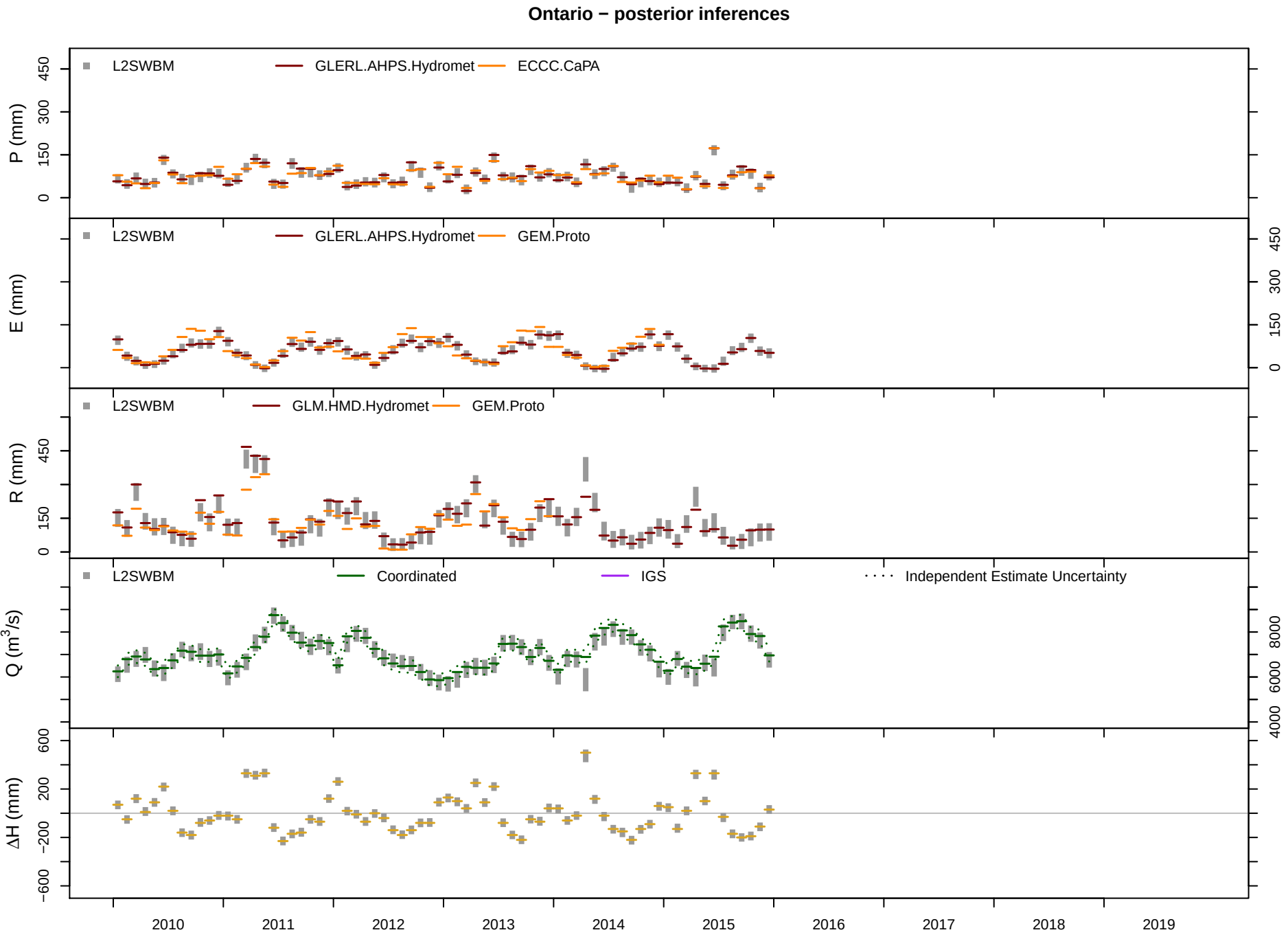
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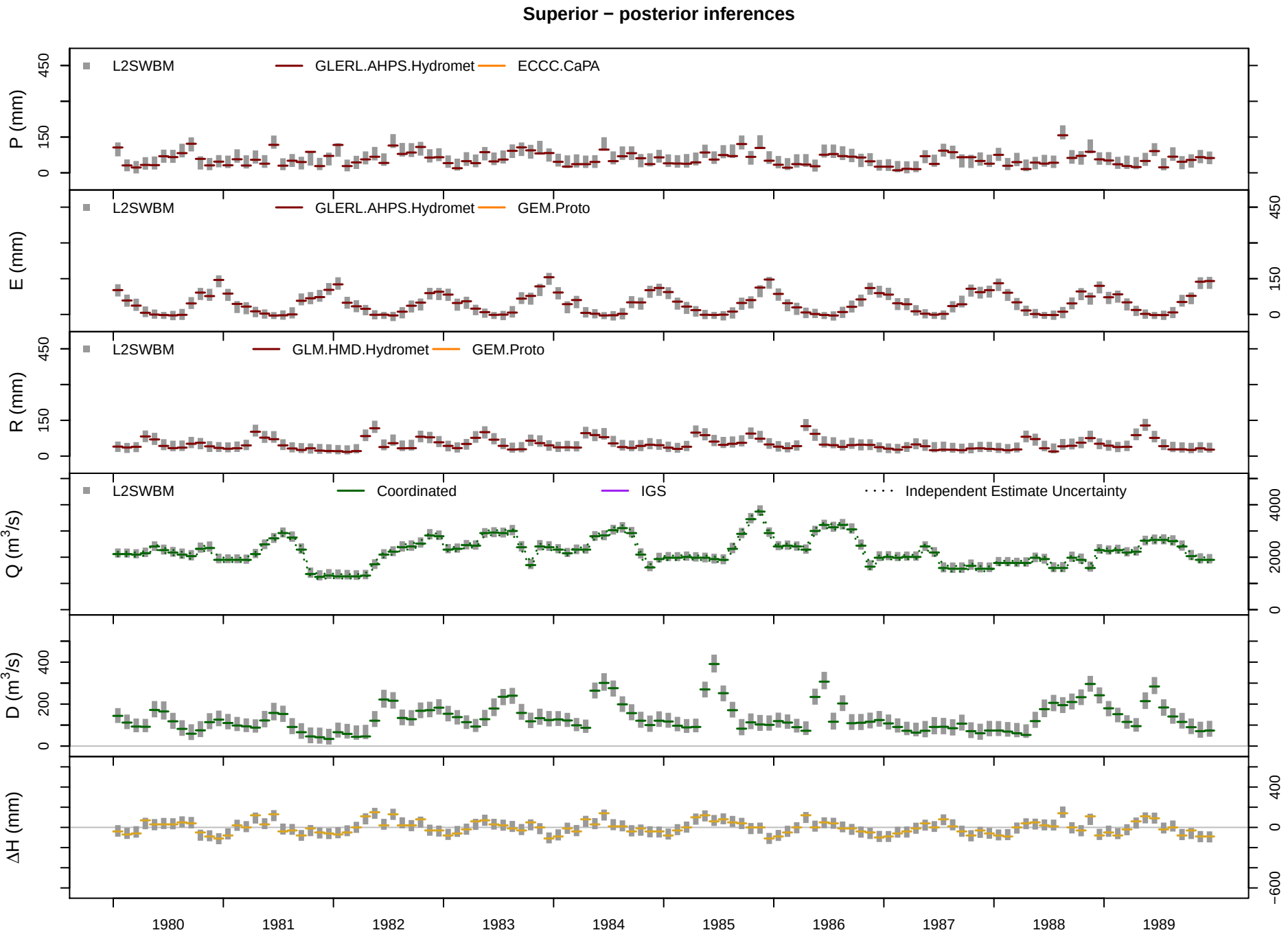
HISTORICAL DATA AND NEW WATER BALANCE COMPONENTS:

L2SWBM CONFIGURATION WITH 6-MONTH ROLLING WINDOW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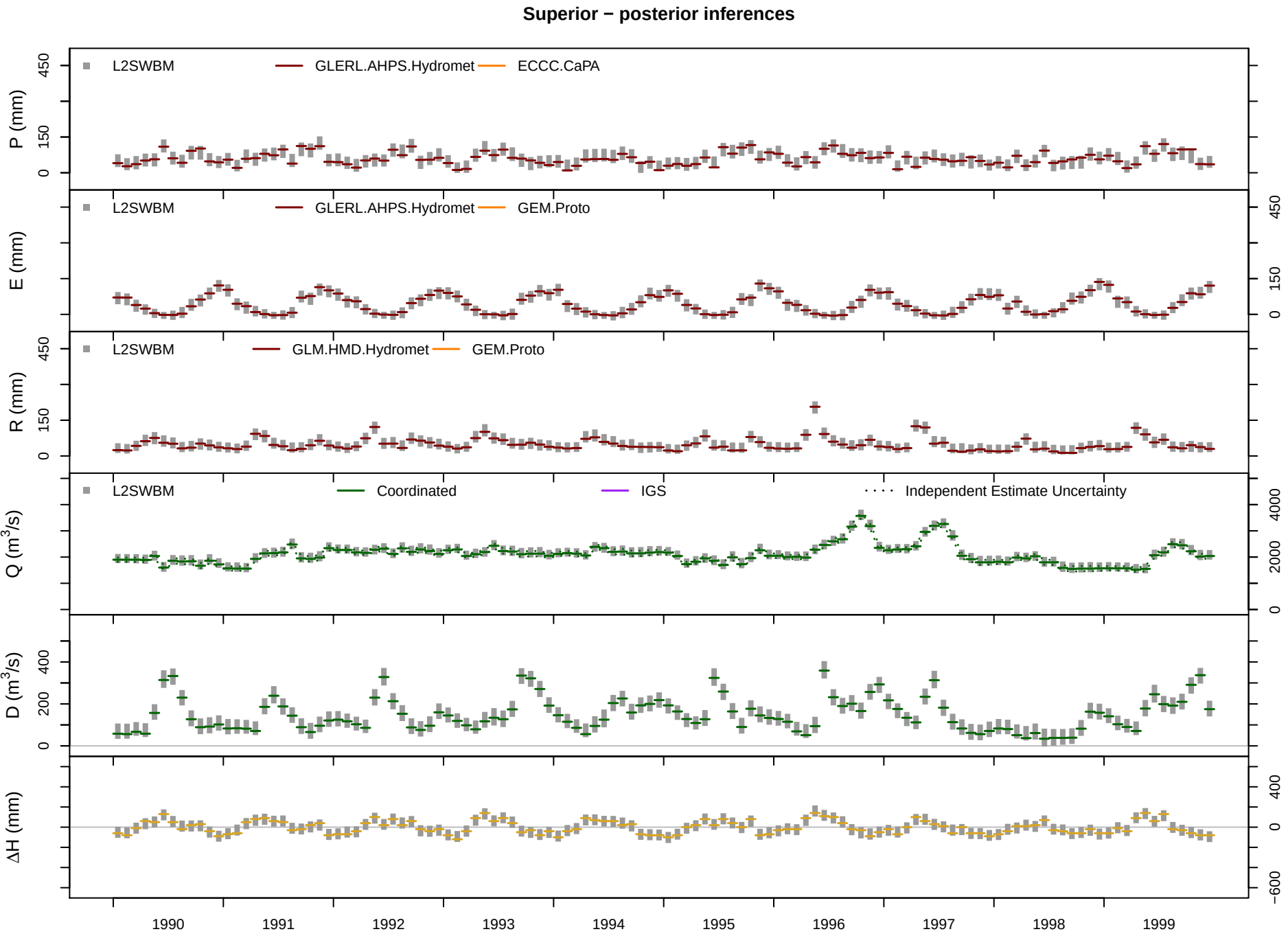
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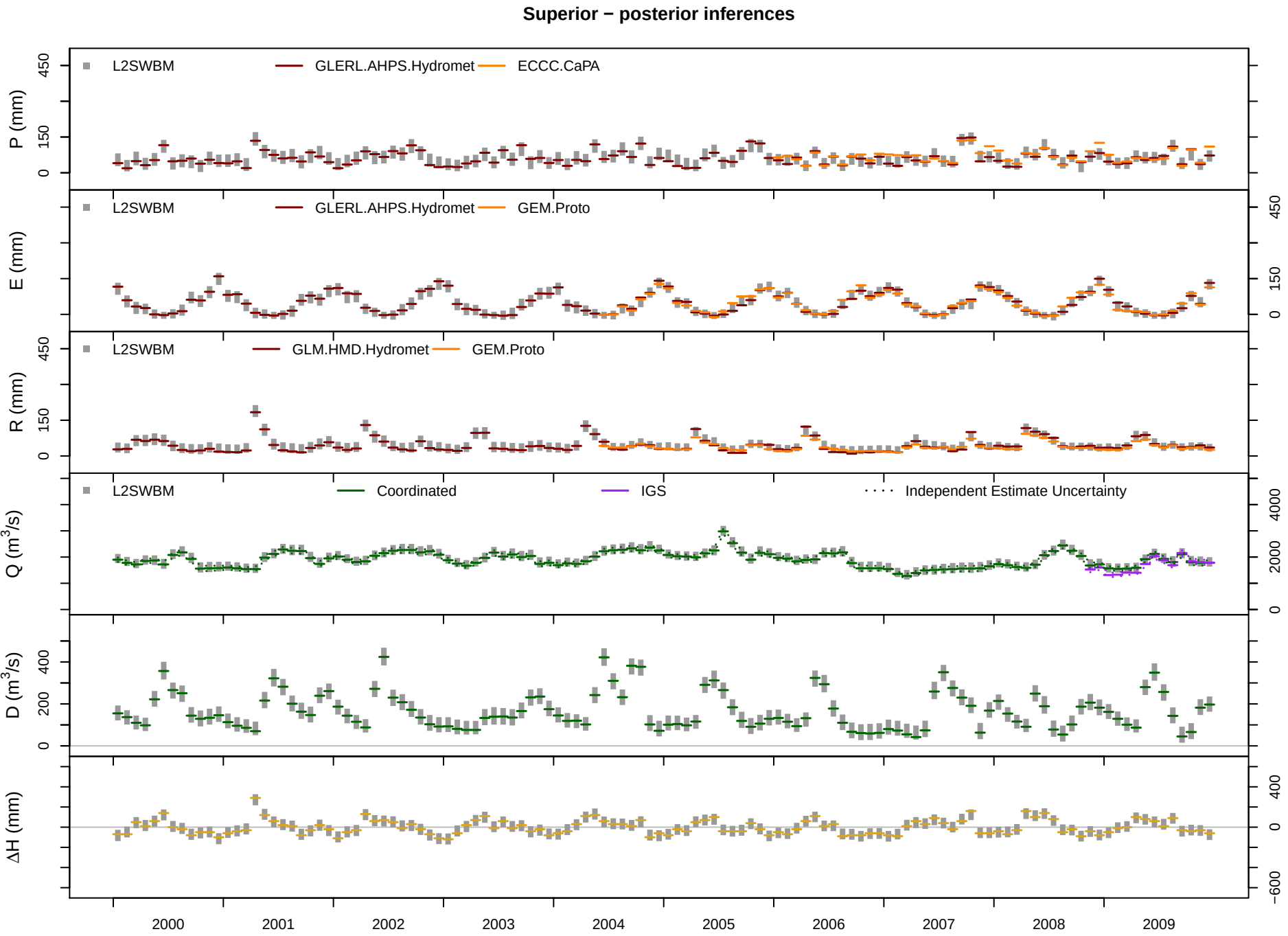
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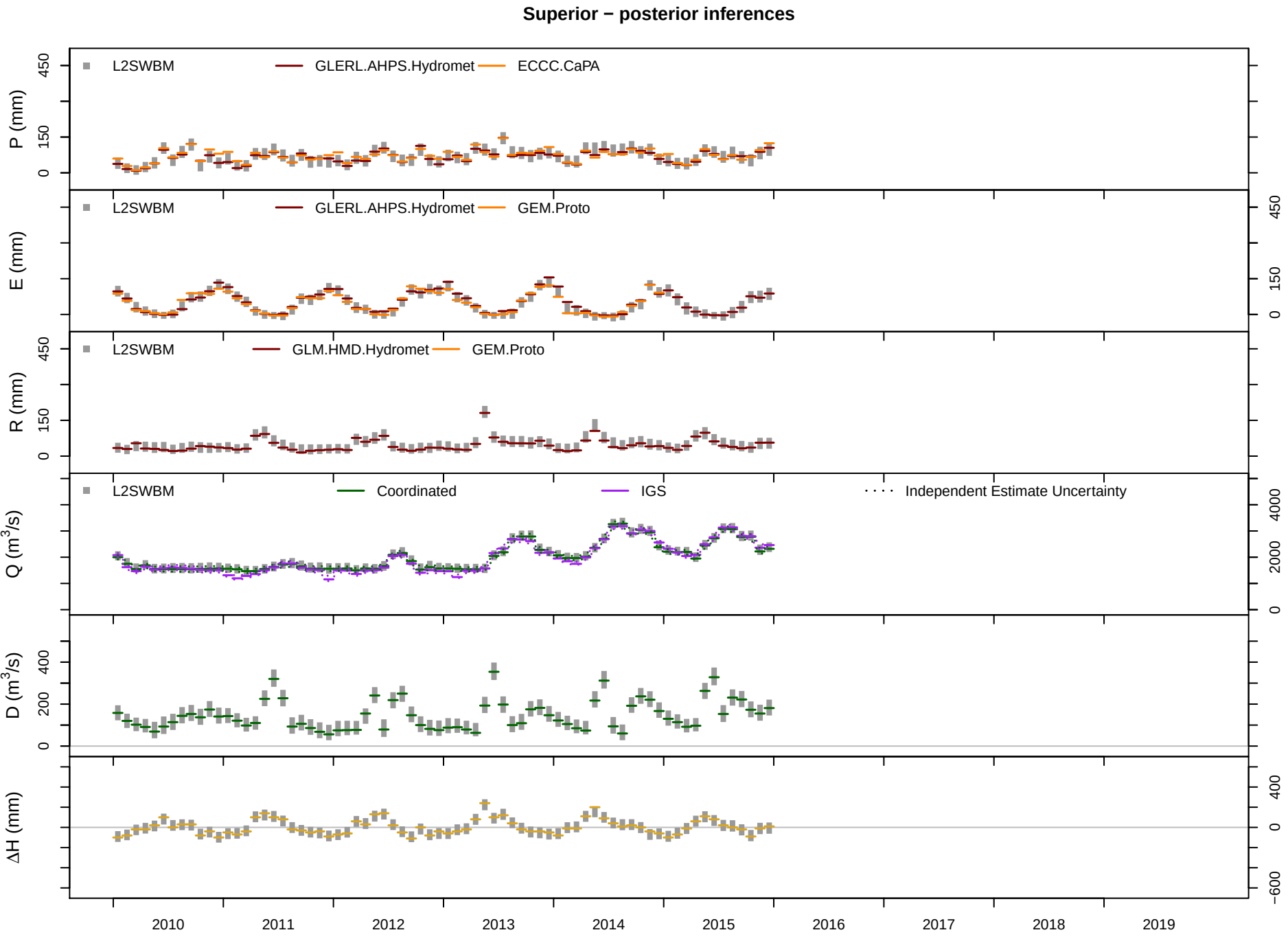
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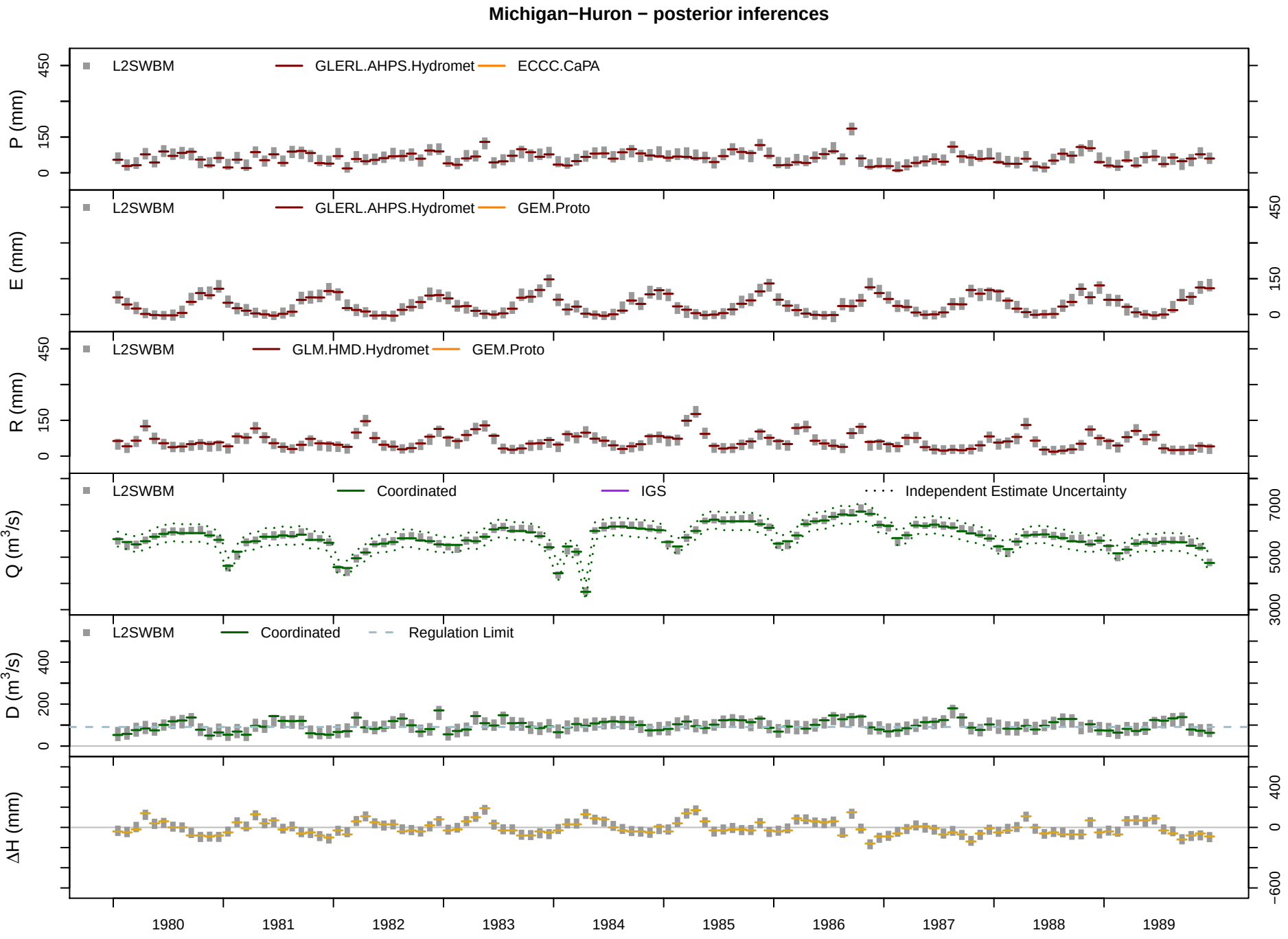
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GEM.Proto
R (mm)
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GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
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Coordinated
IGS
Independent Estimate Uncertainty
D (m3/s)
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Coordinated
Regulation Limit
ΔH (mm)
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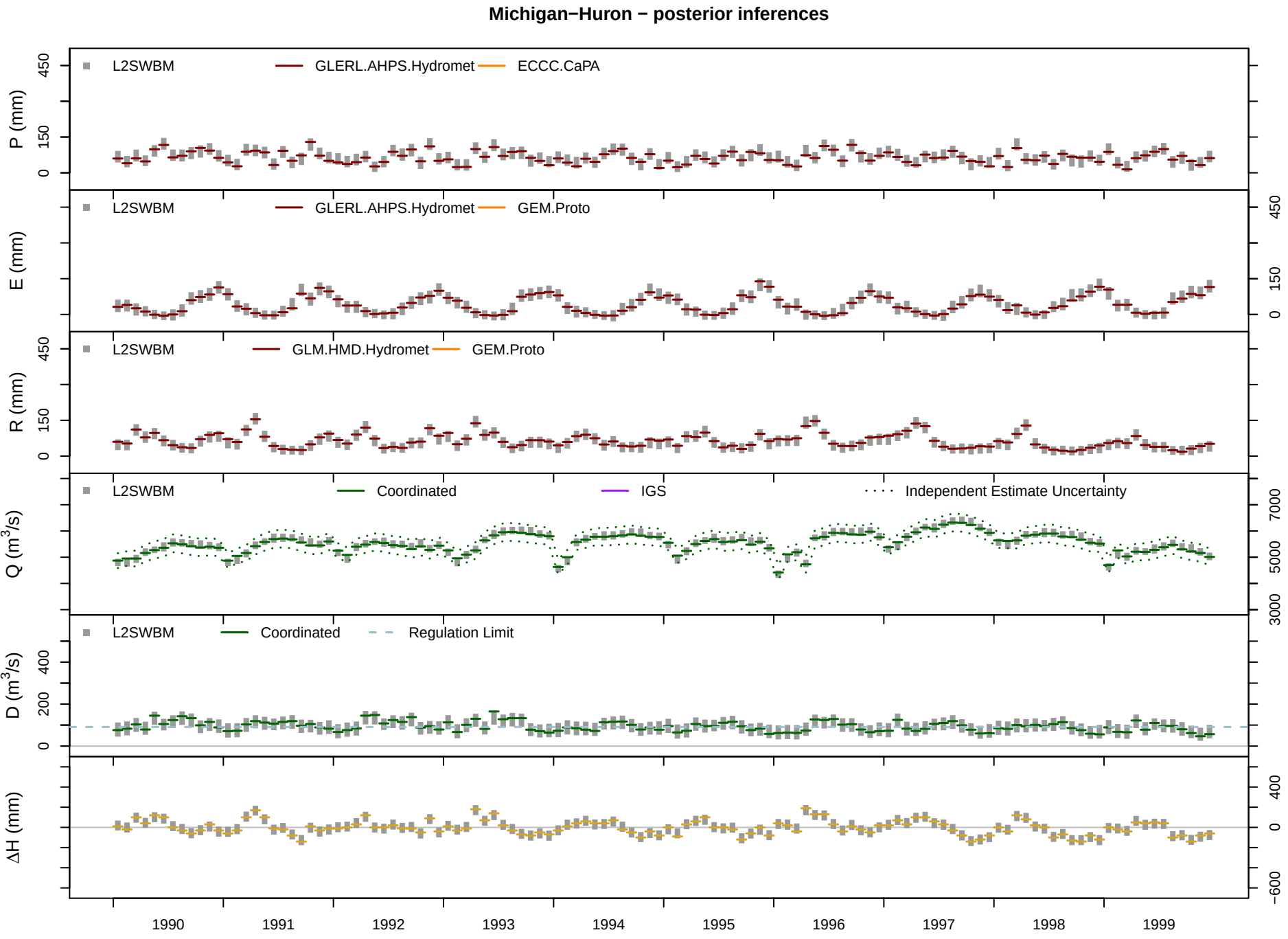
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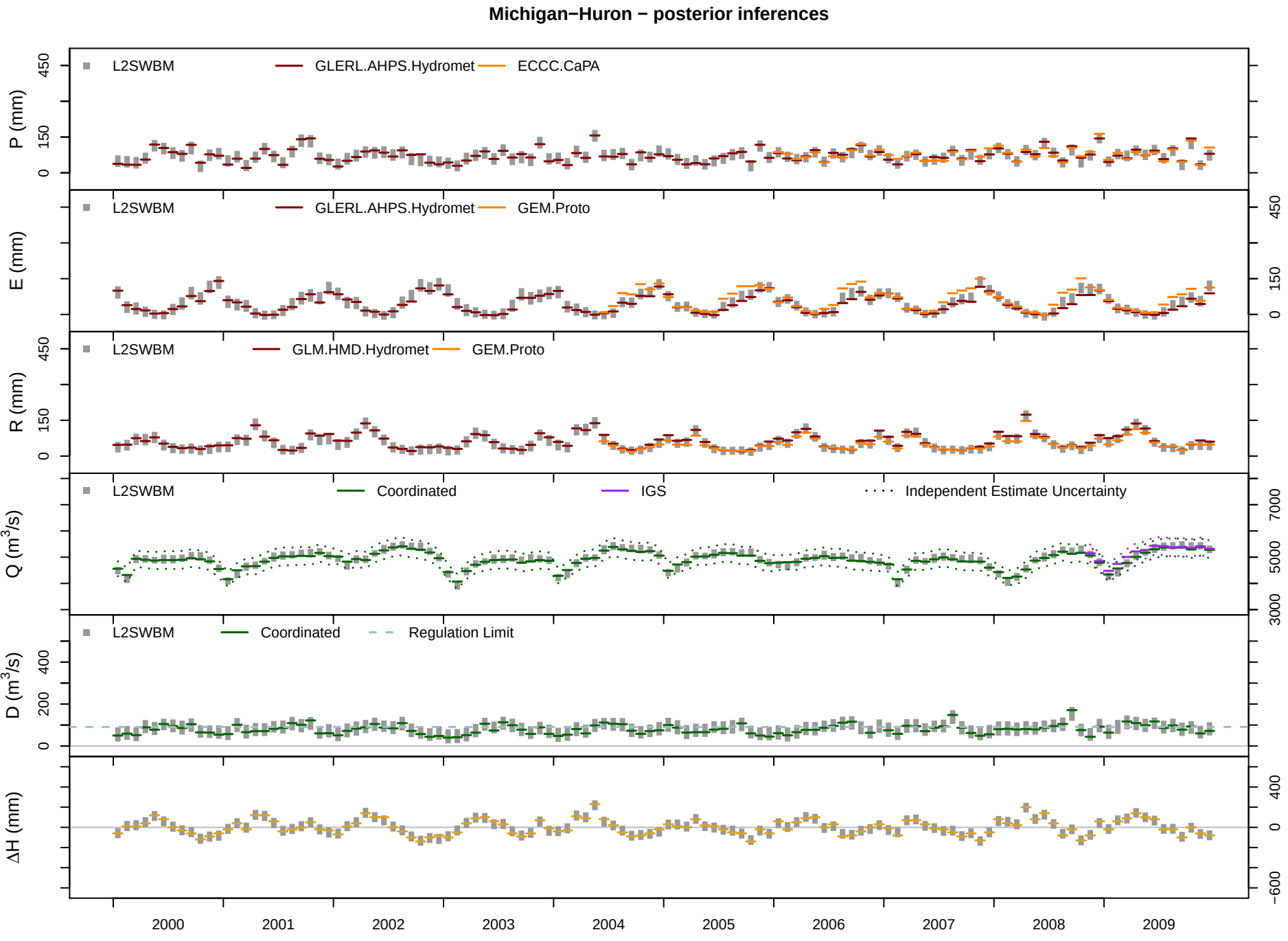
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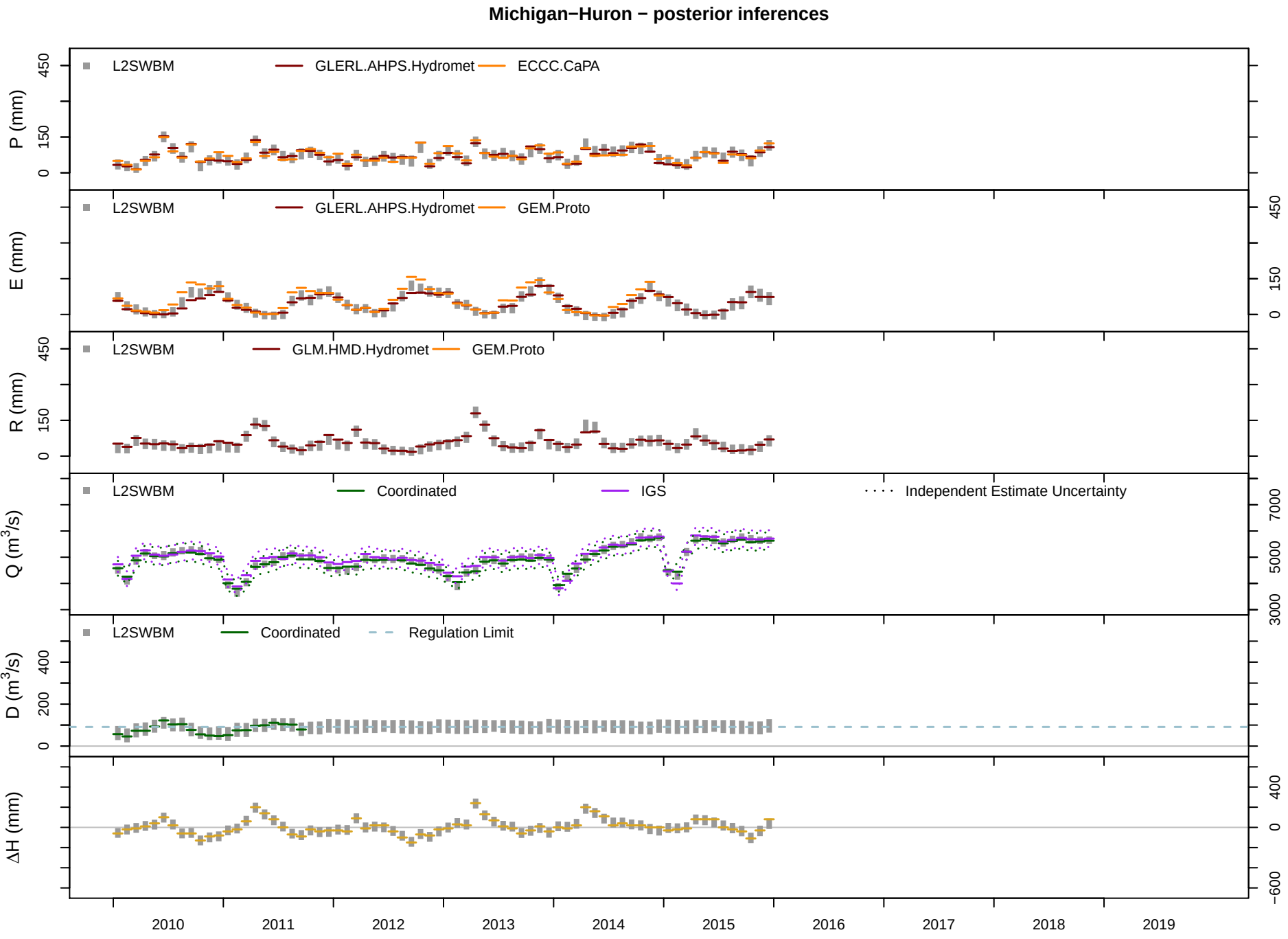
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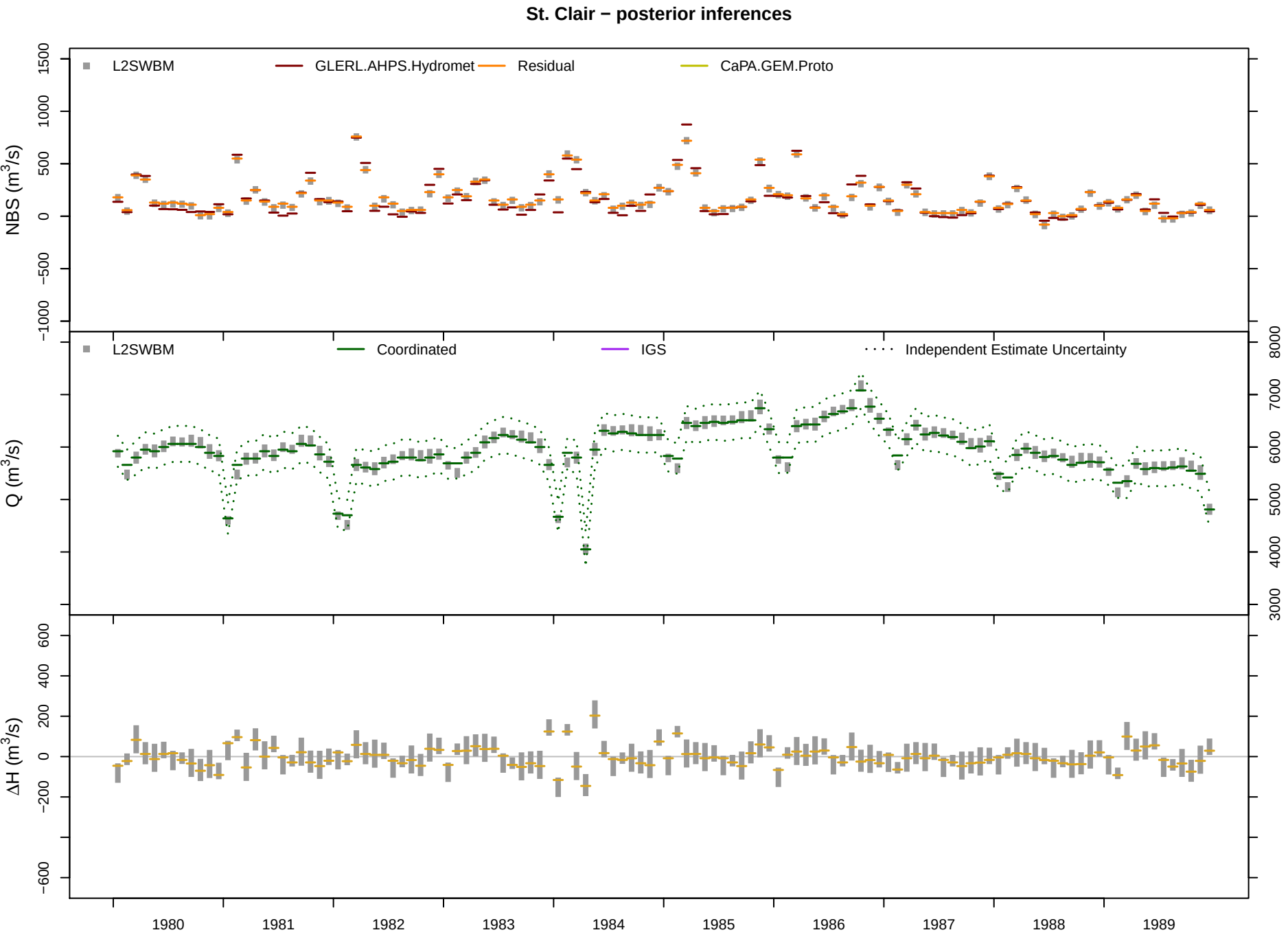
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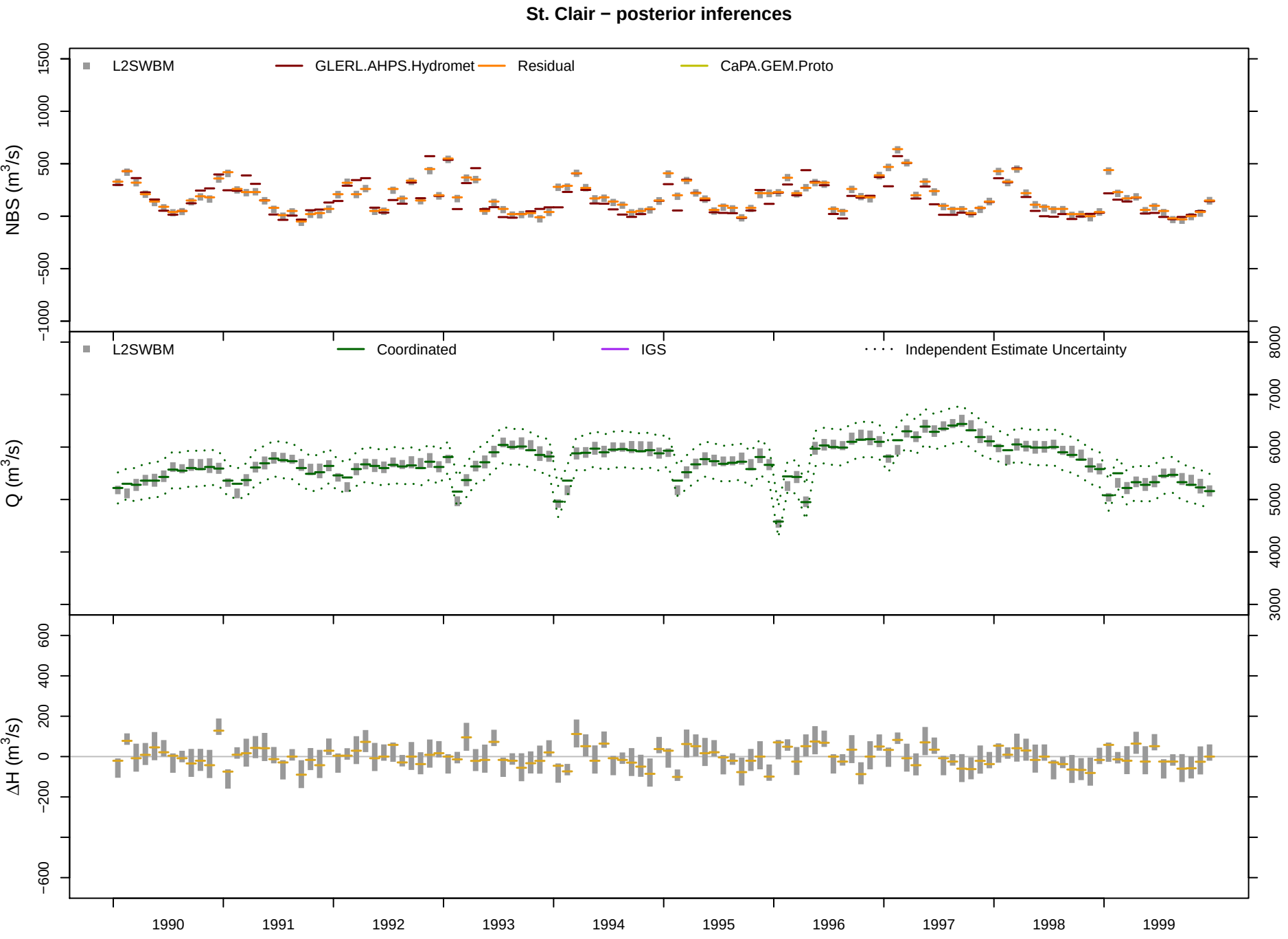
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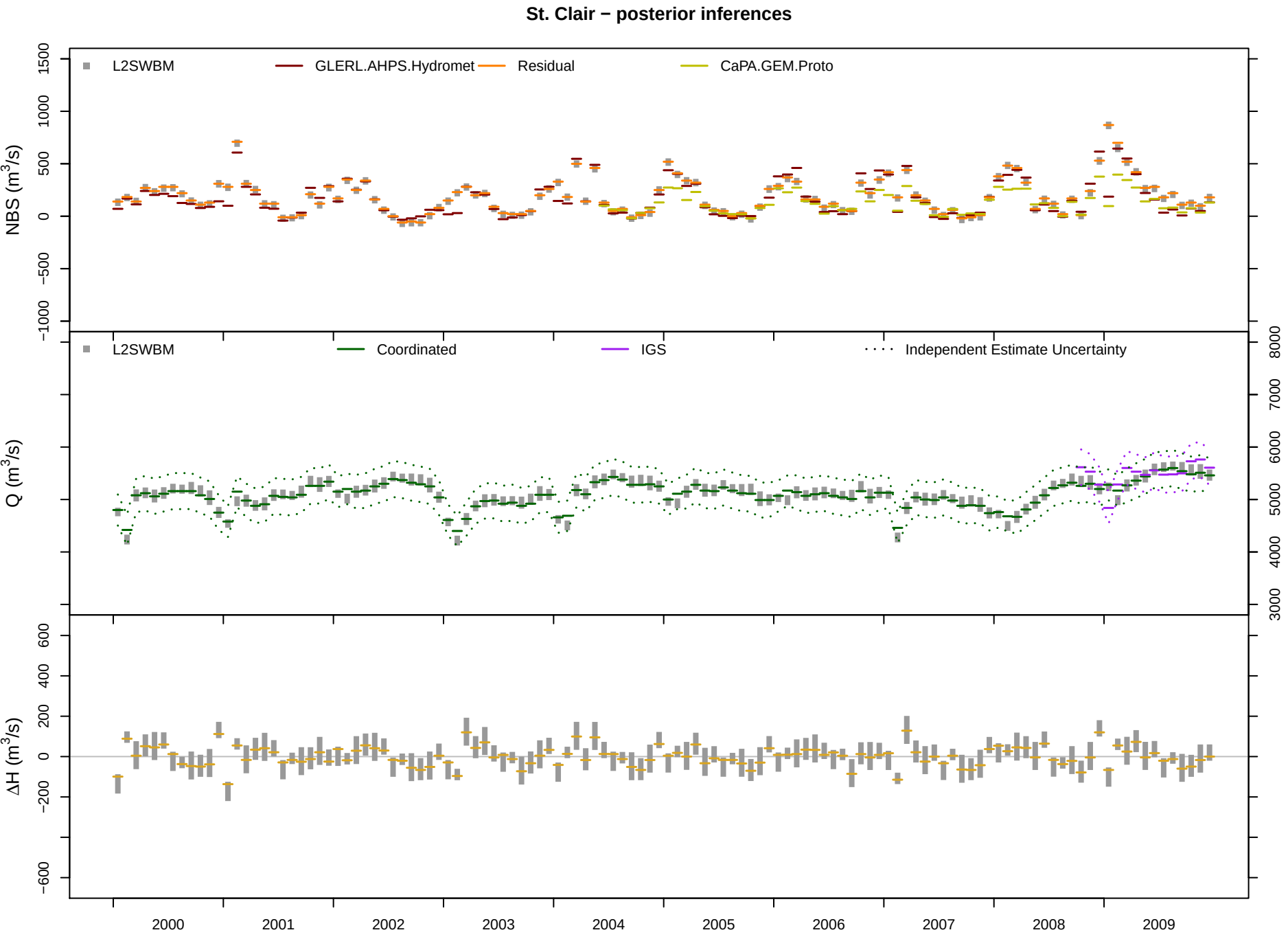
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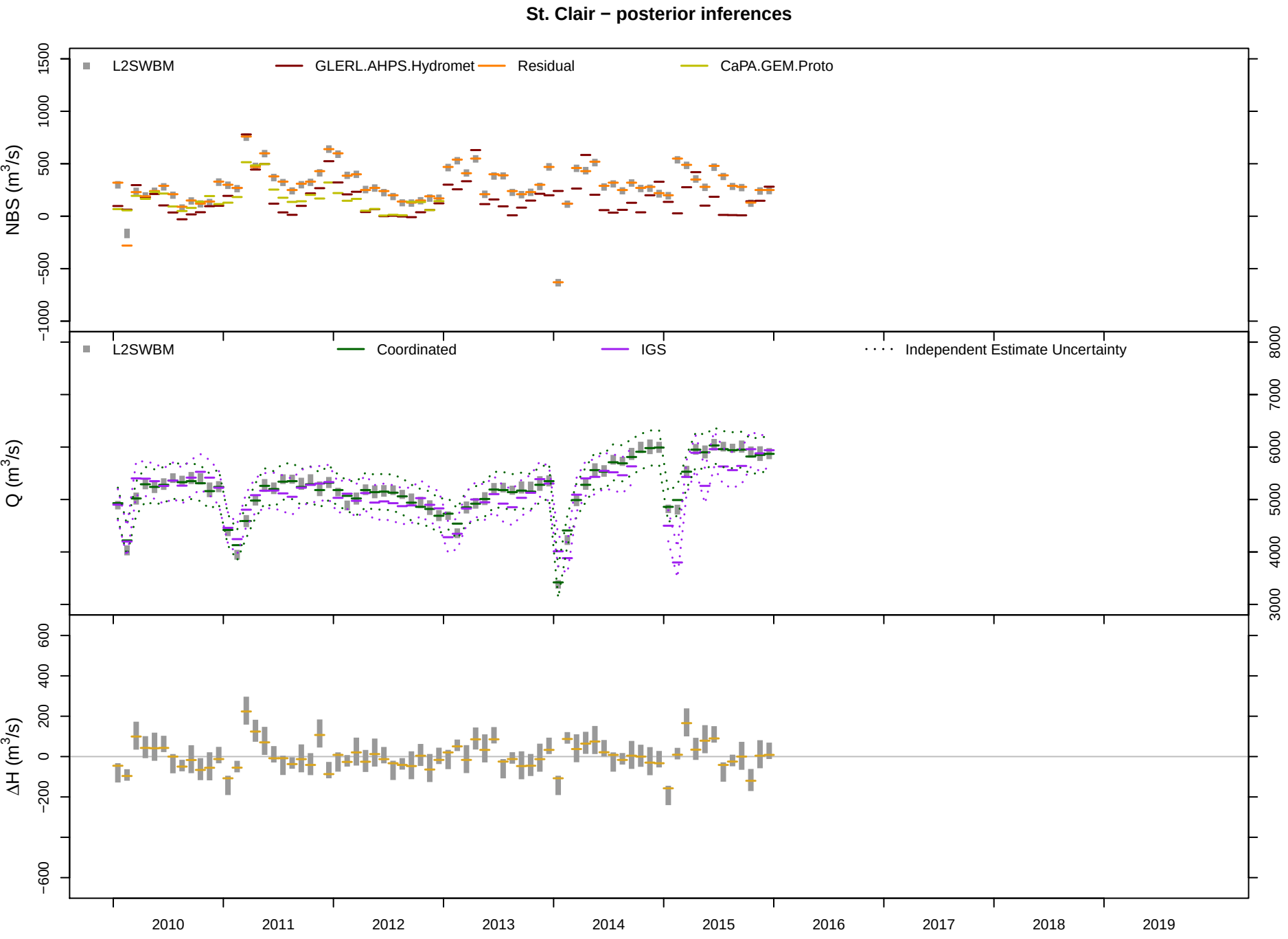
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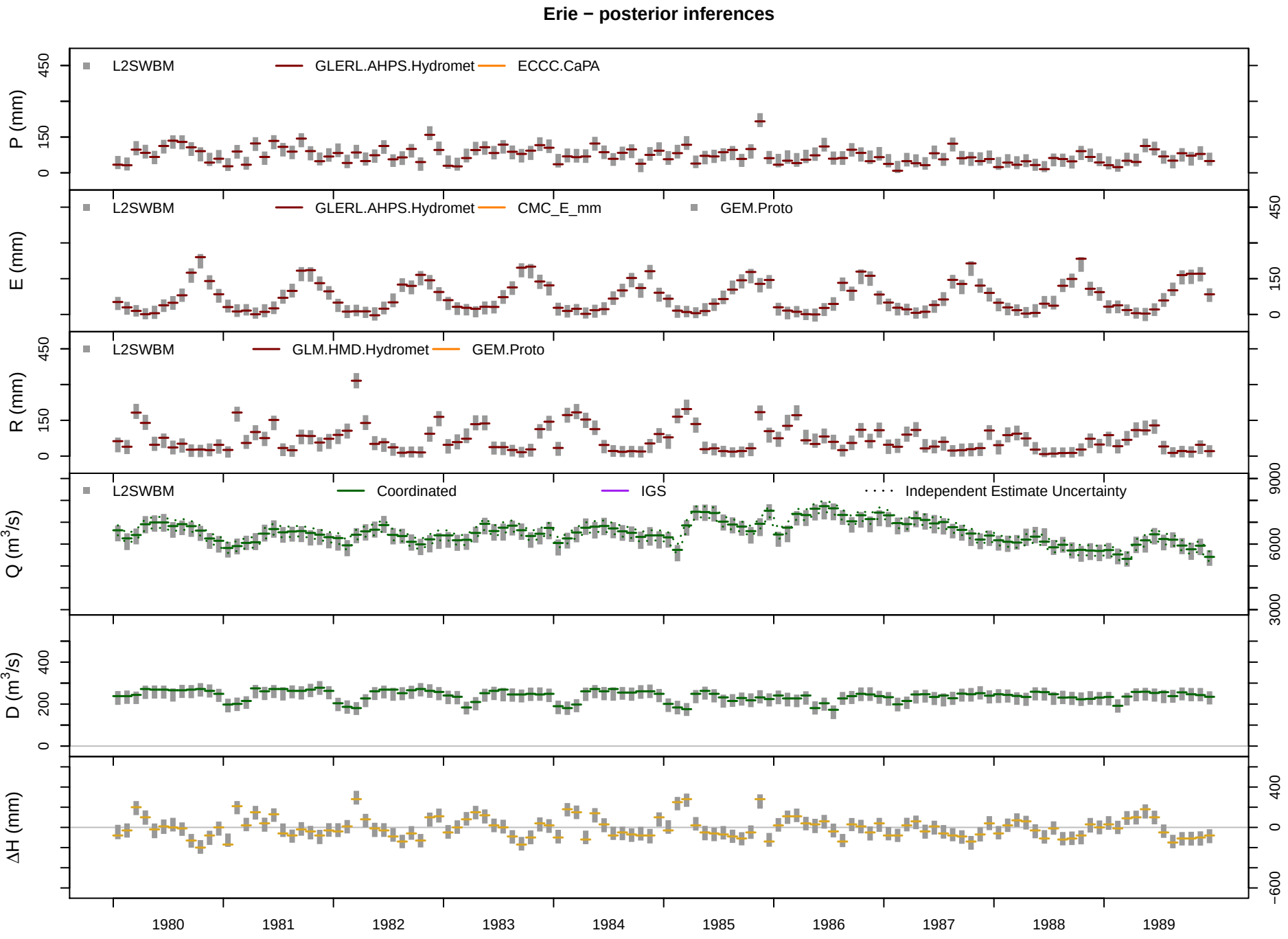
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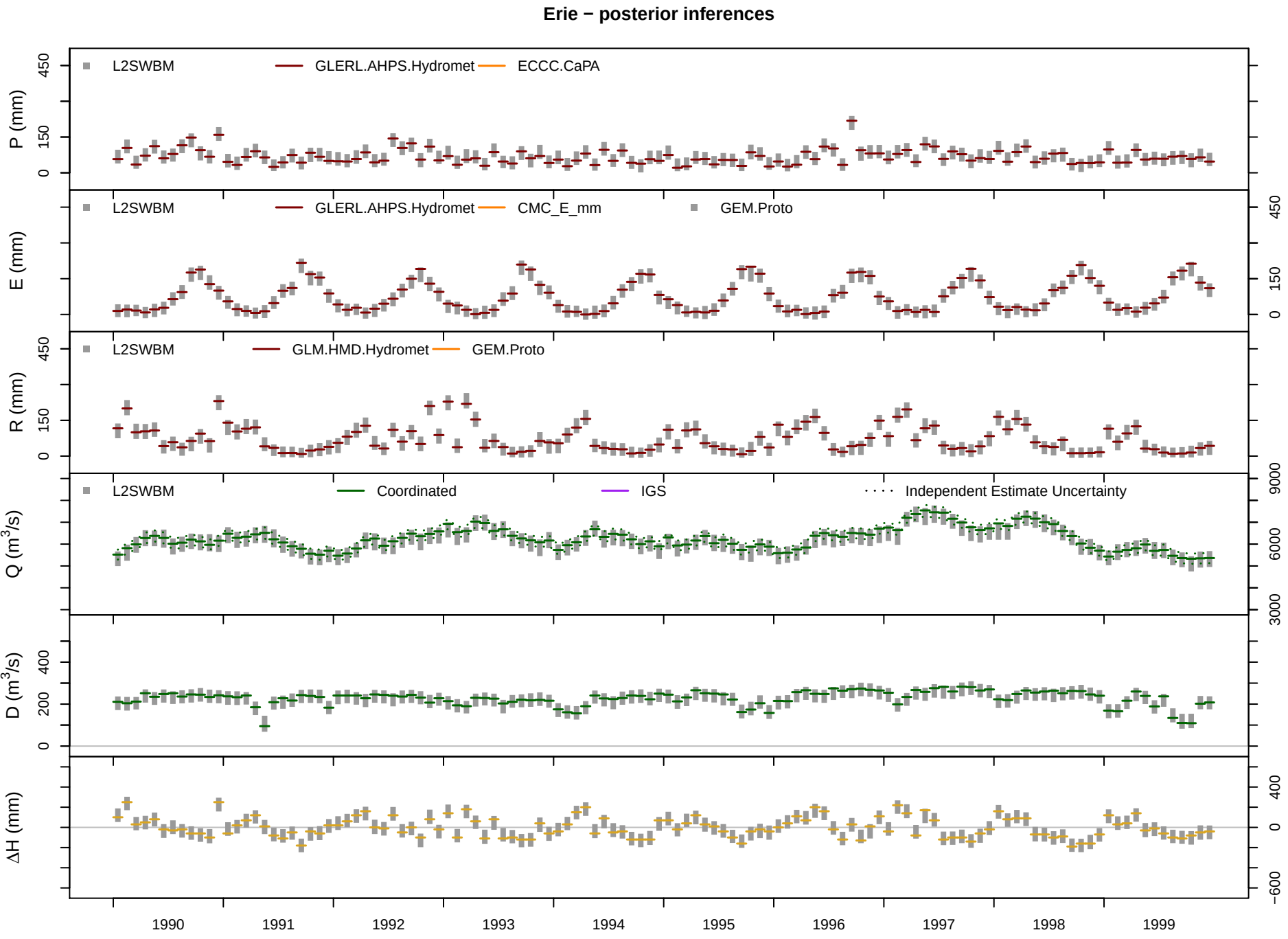
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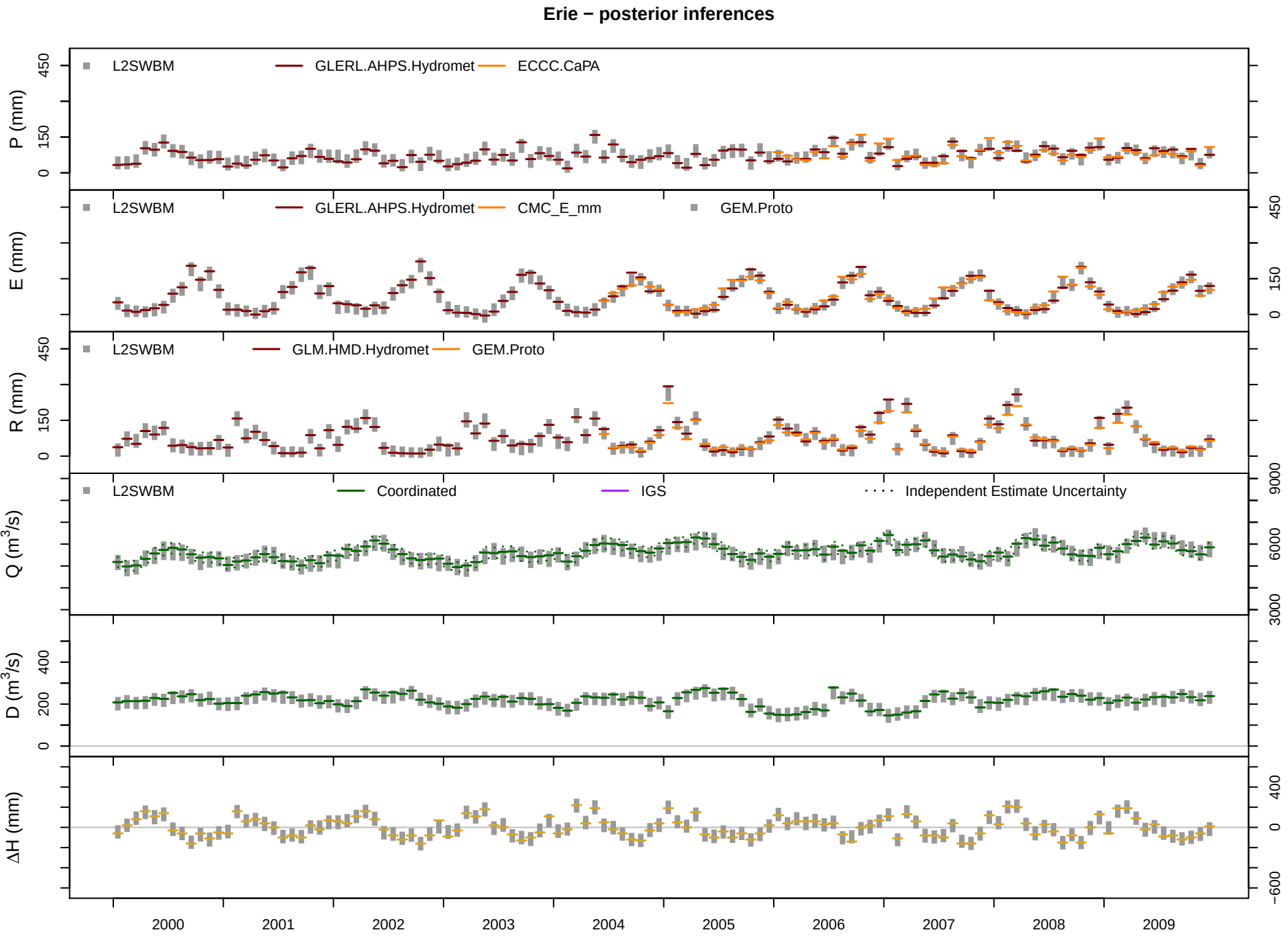
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GLERL.AHPS.Hydromet
CMC_E_mm
GEM.Proto
E (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
R (mm)
L2SWBM
Coordinated
IGS
Independent Estimate Uncertainty
Q (m3/s)
D (m3/s)
ΔH (mm)
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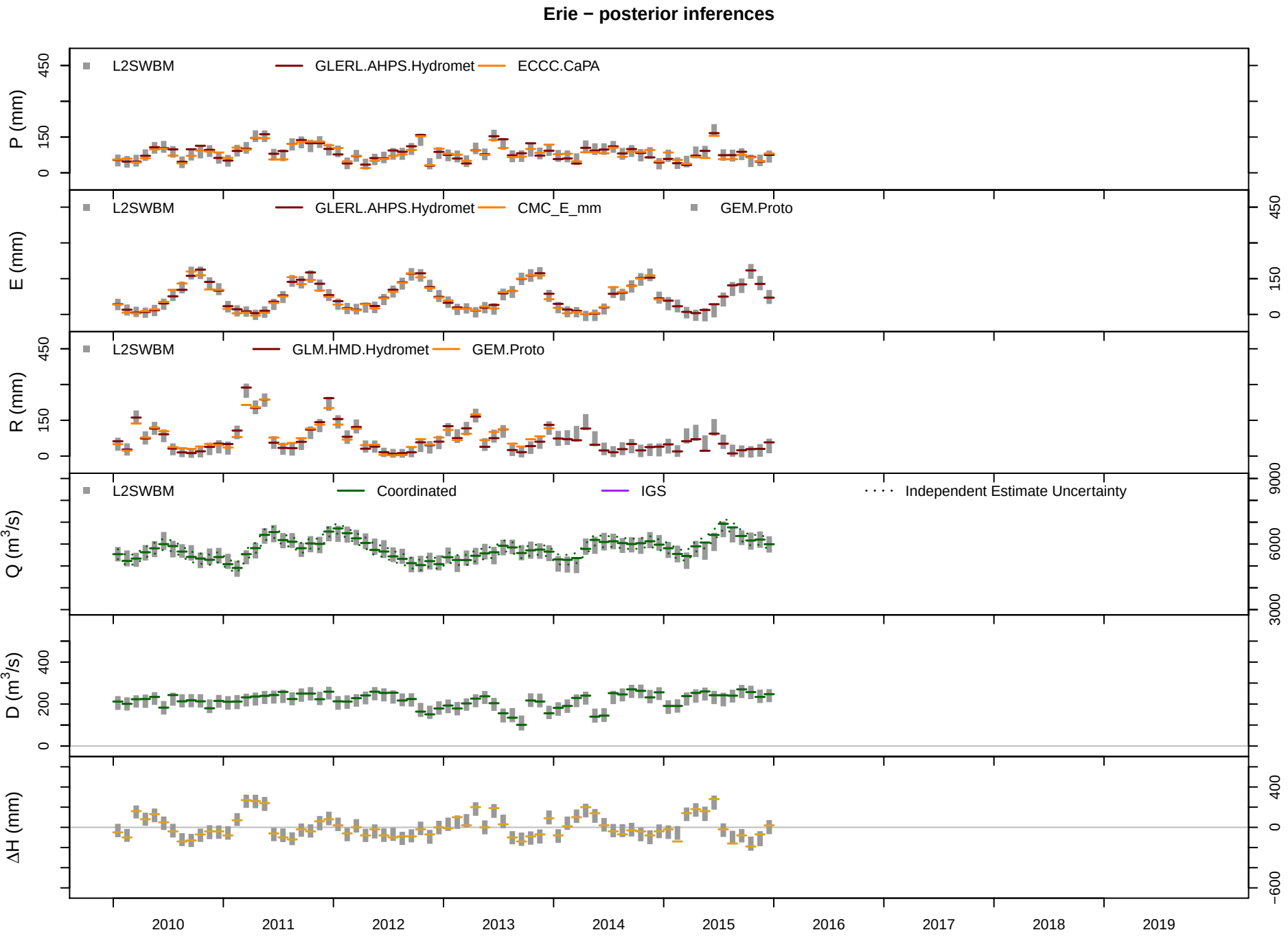
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P (mm)
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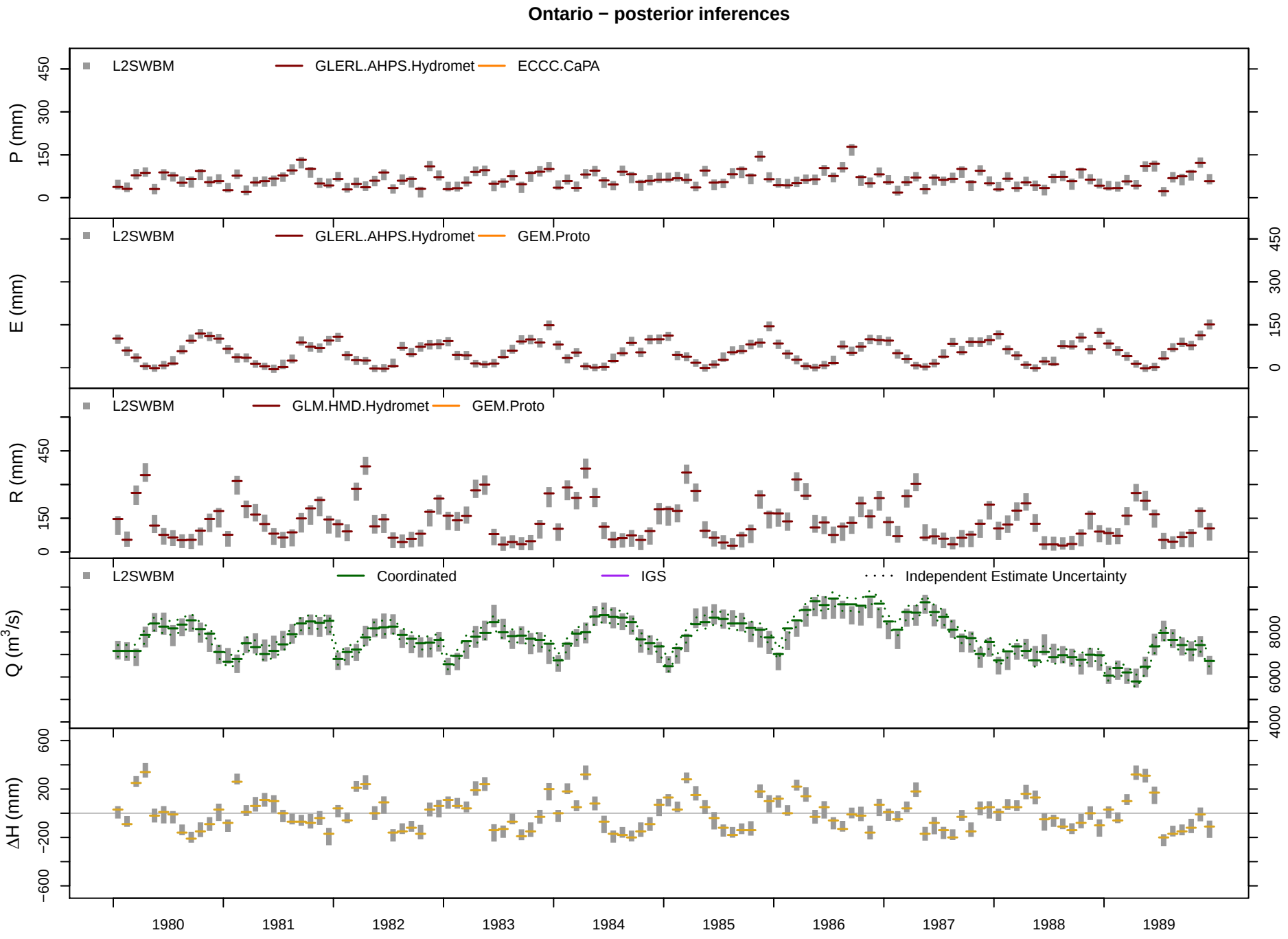
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GEM.Proto
E (mm)
0
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300
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L2SWBM
GLM.HMD.Hydromet
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150
450
L2SWBM
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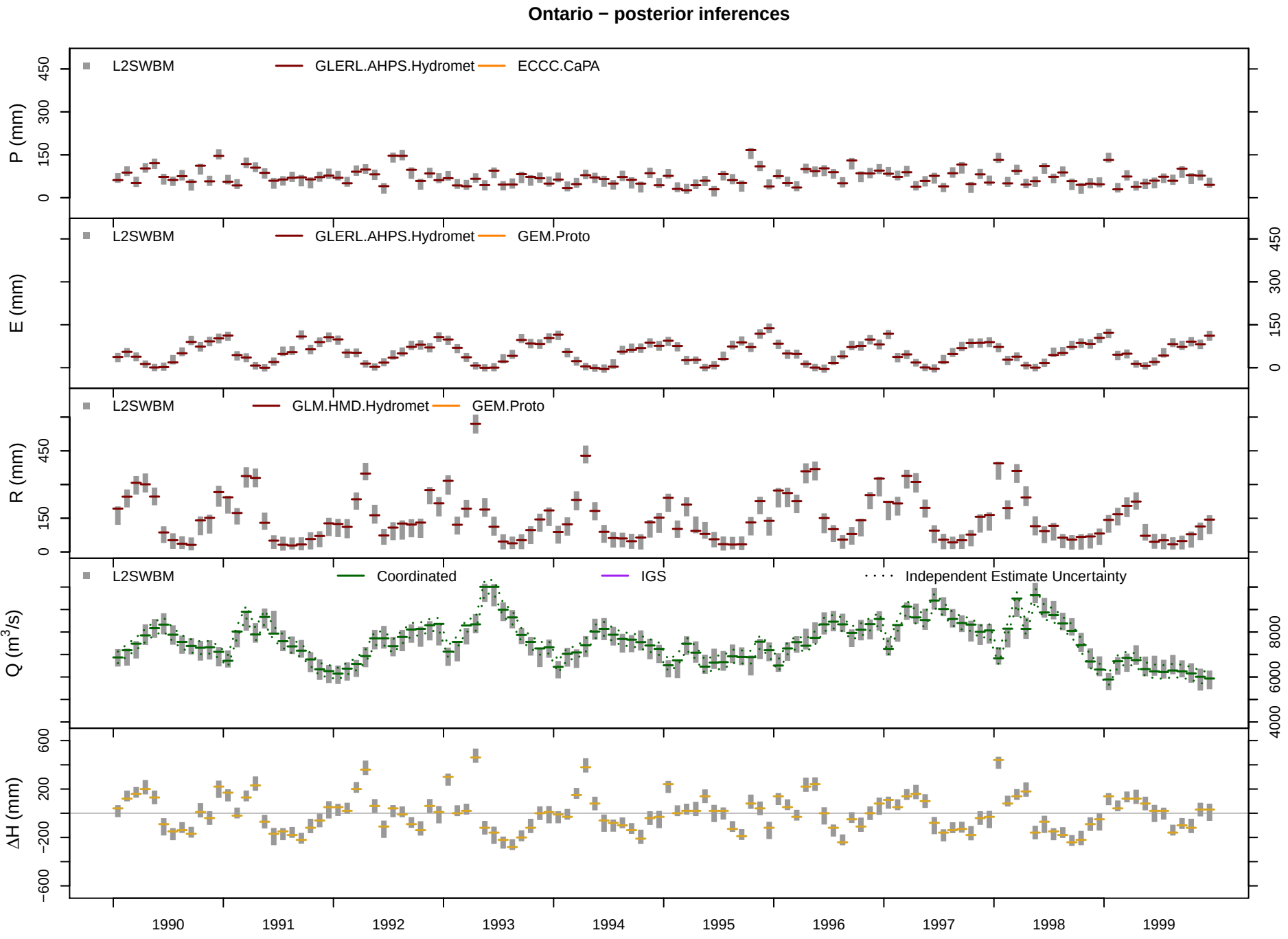
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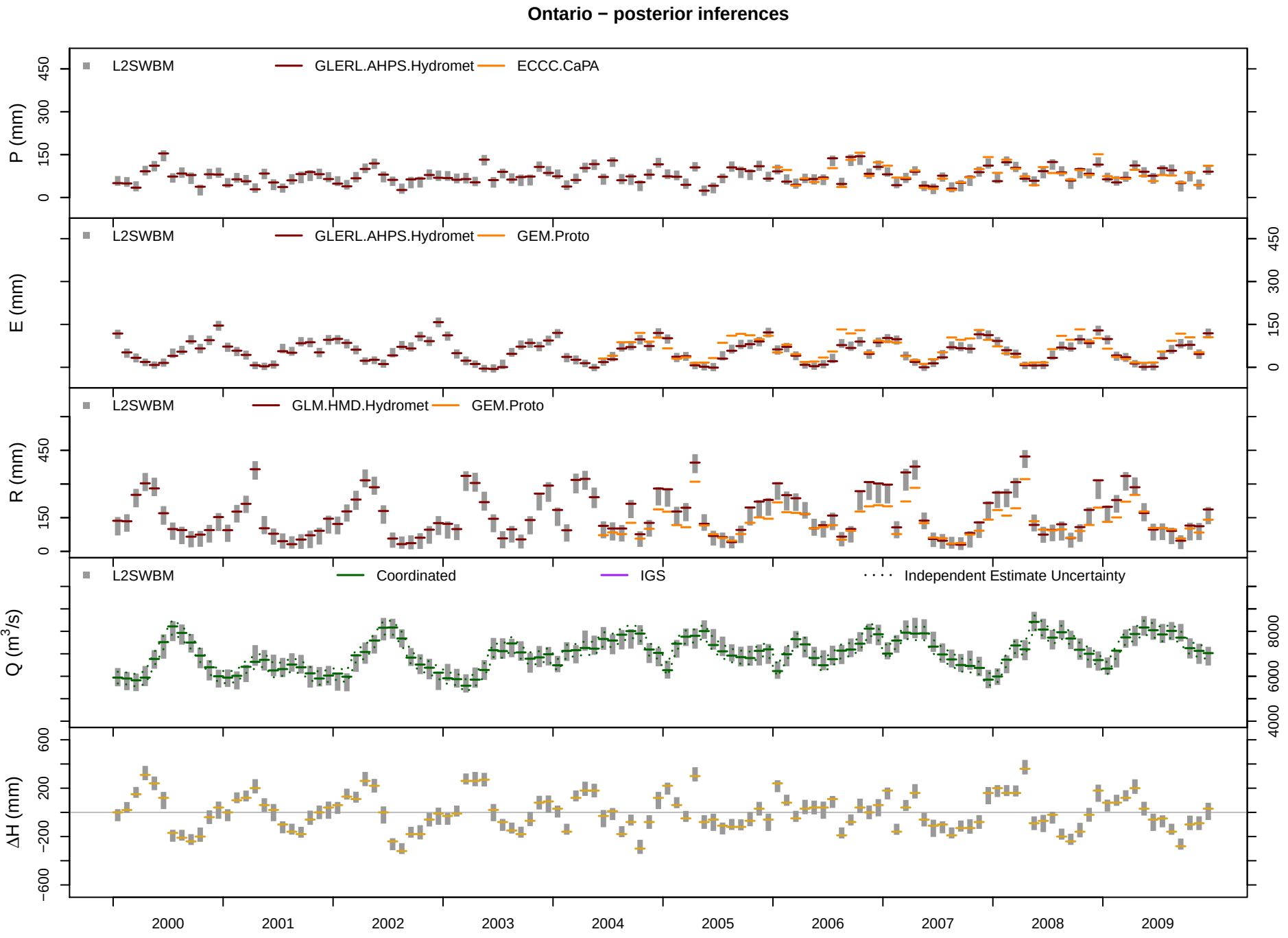
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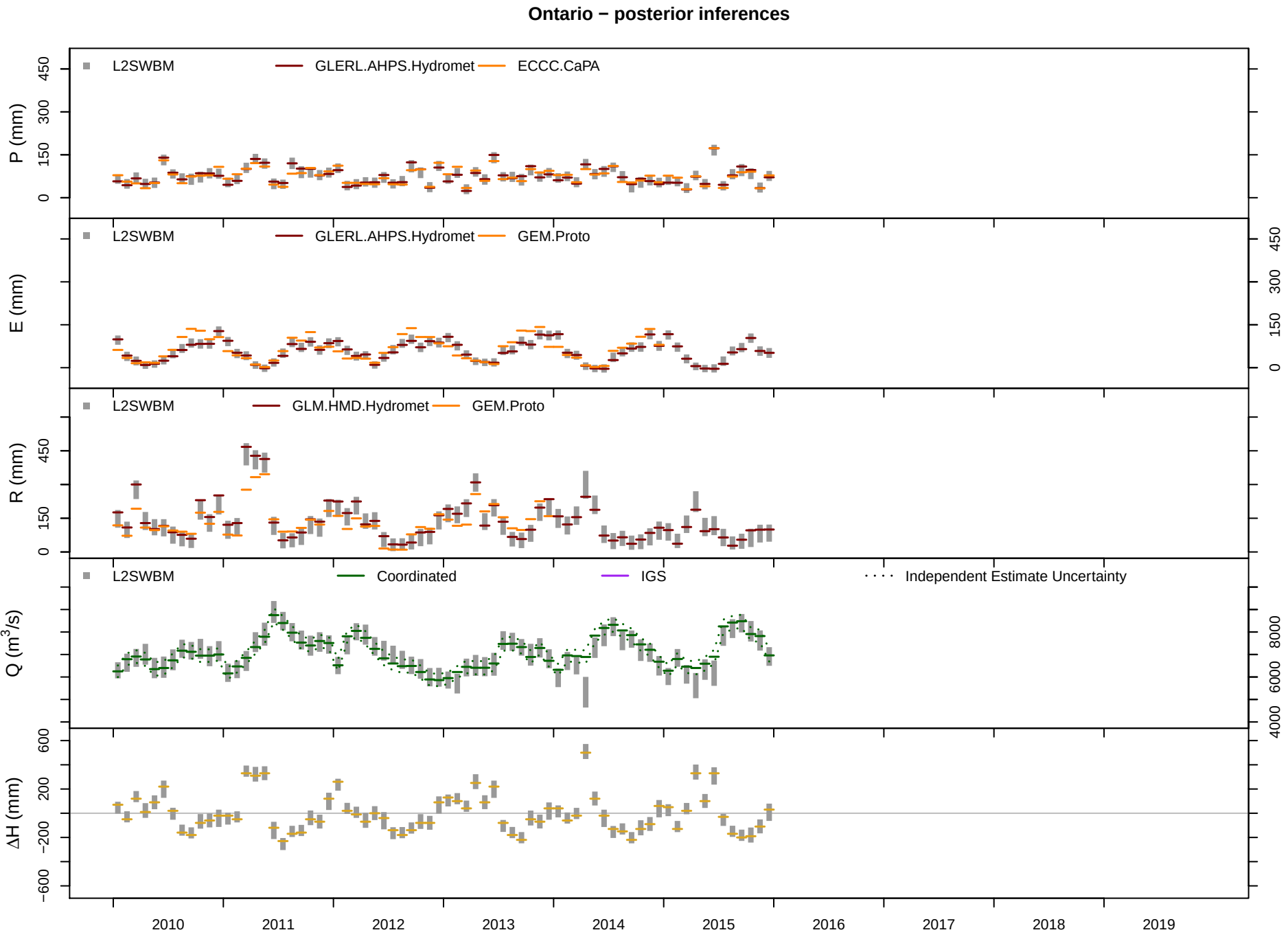
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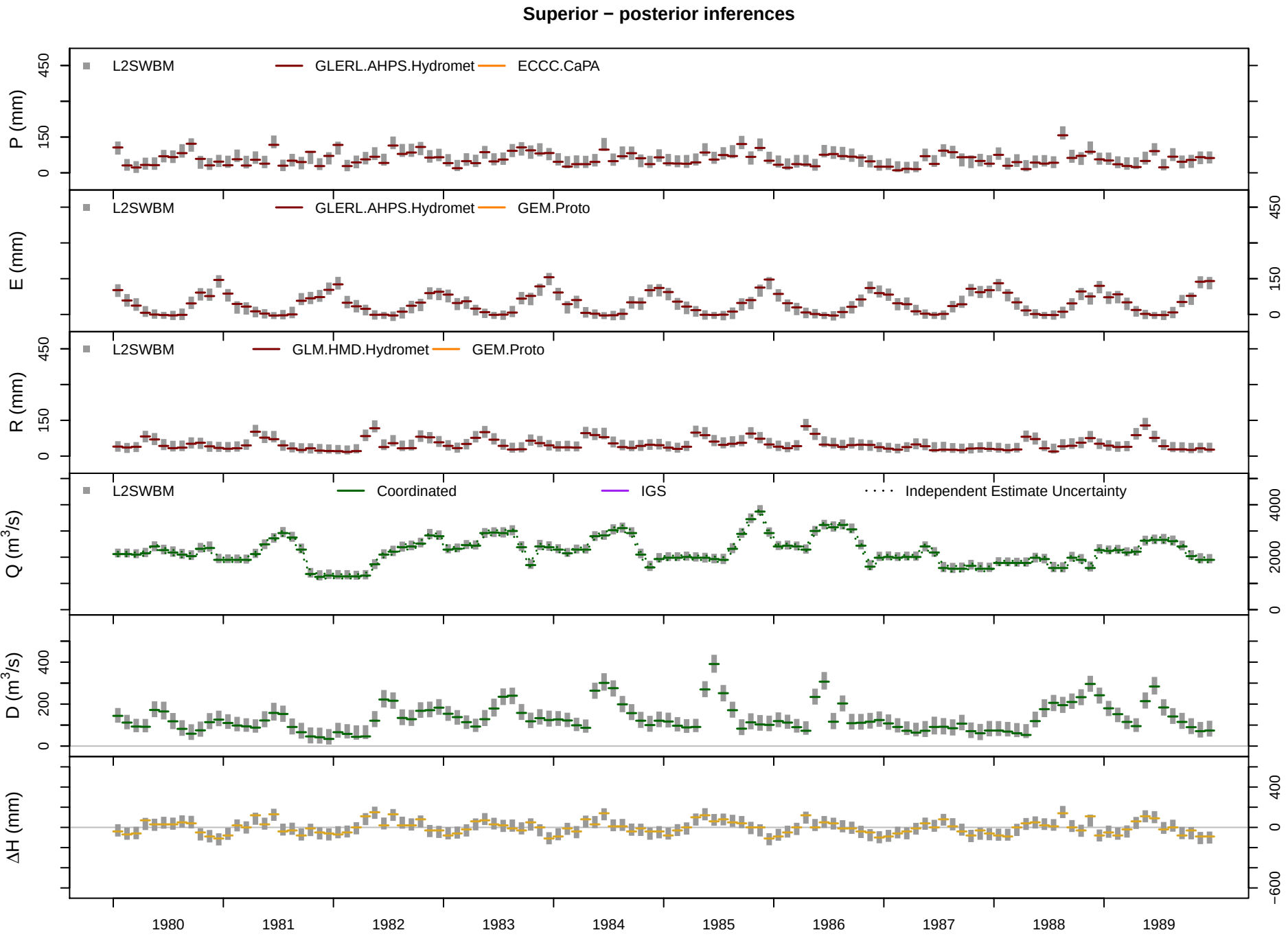
HISTORICAL DATA AND NEW WATER BALANCE COMPONENTS:

L2SWBM CONFIGURATION WITH 12-MONTH ROLLING WINDOW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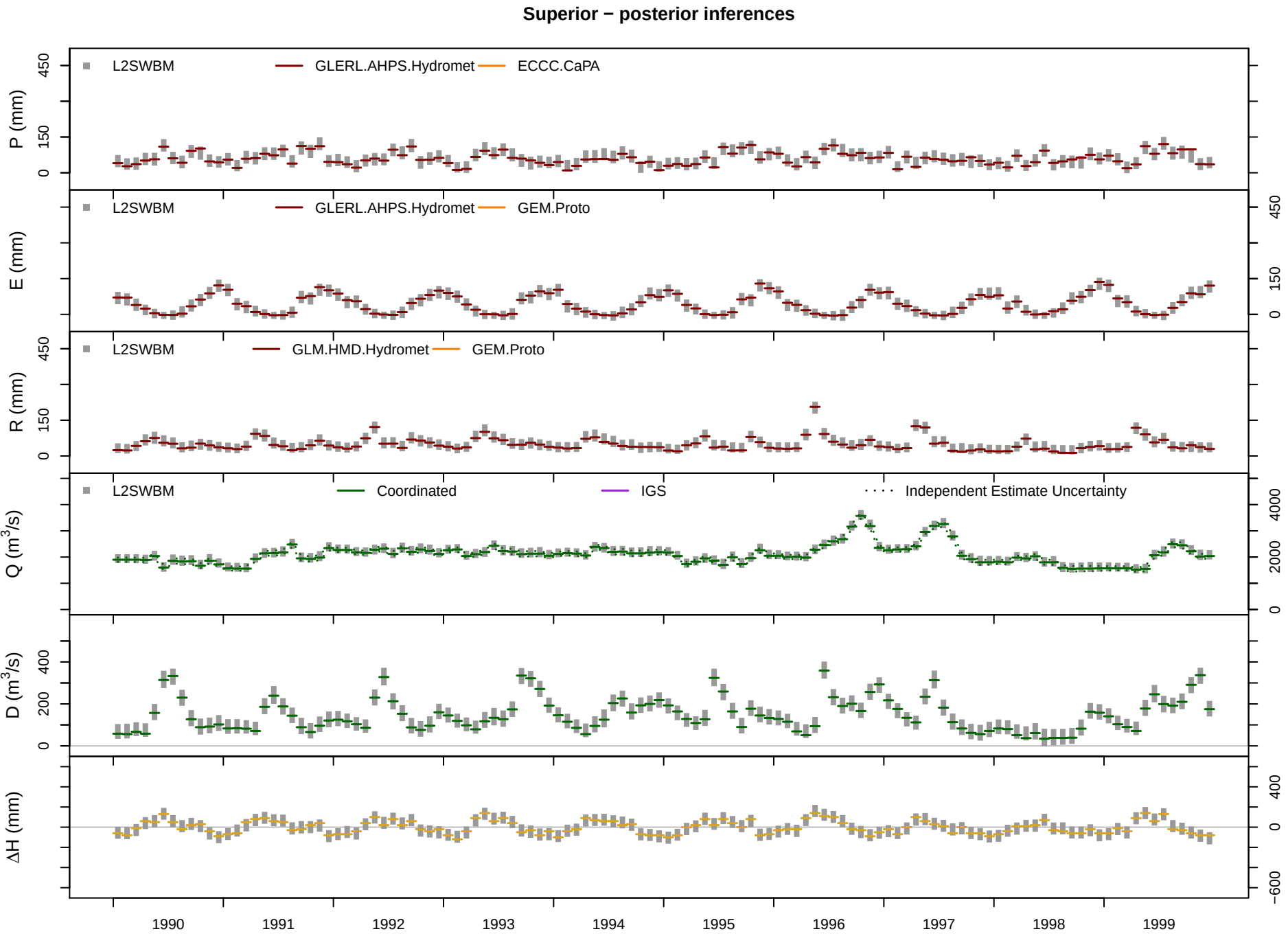
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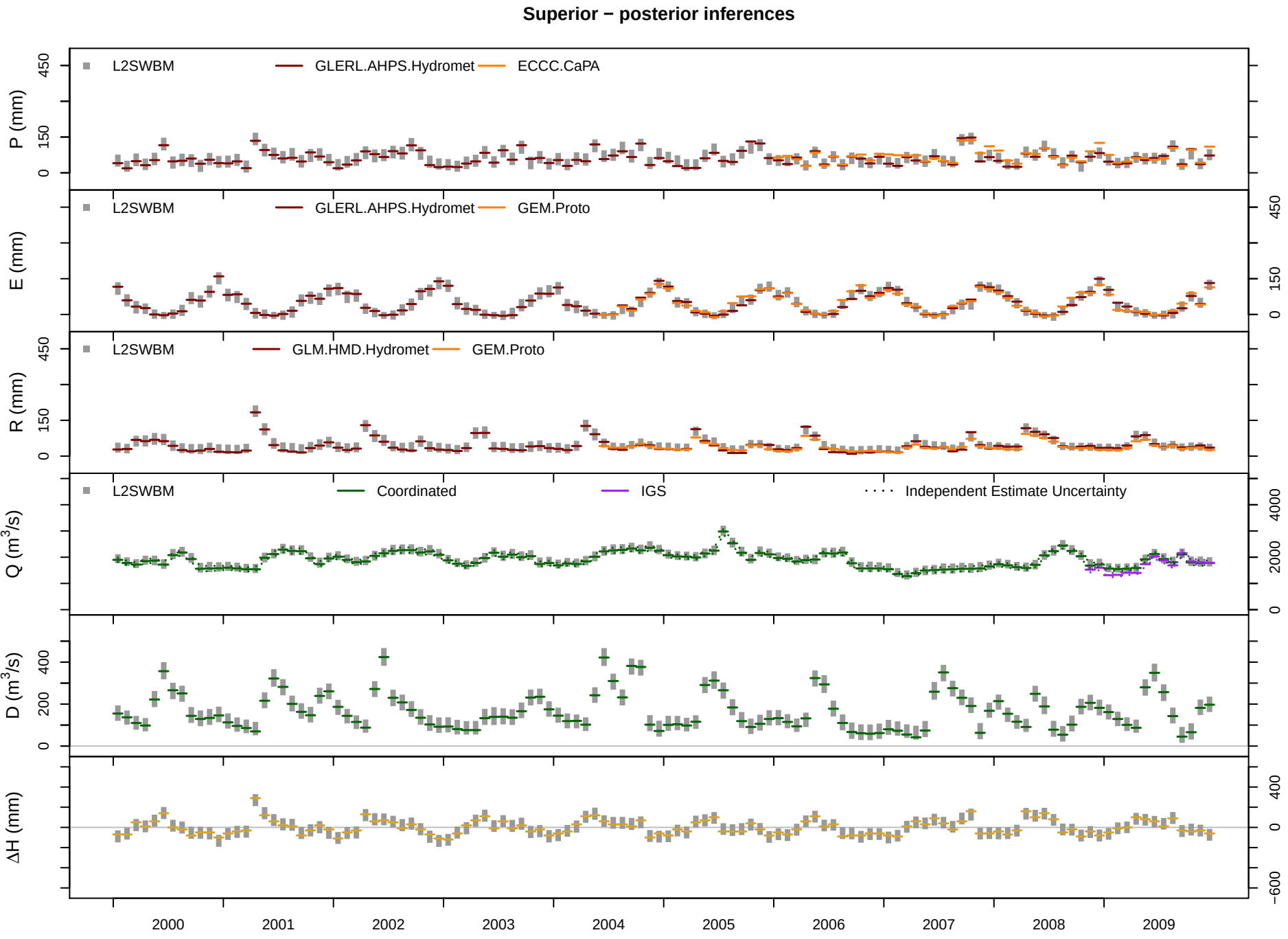
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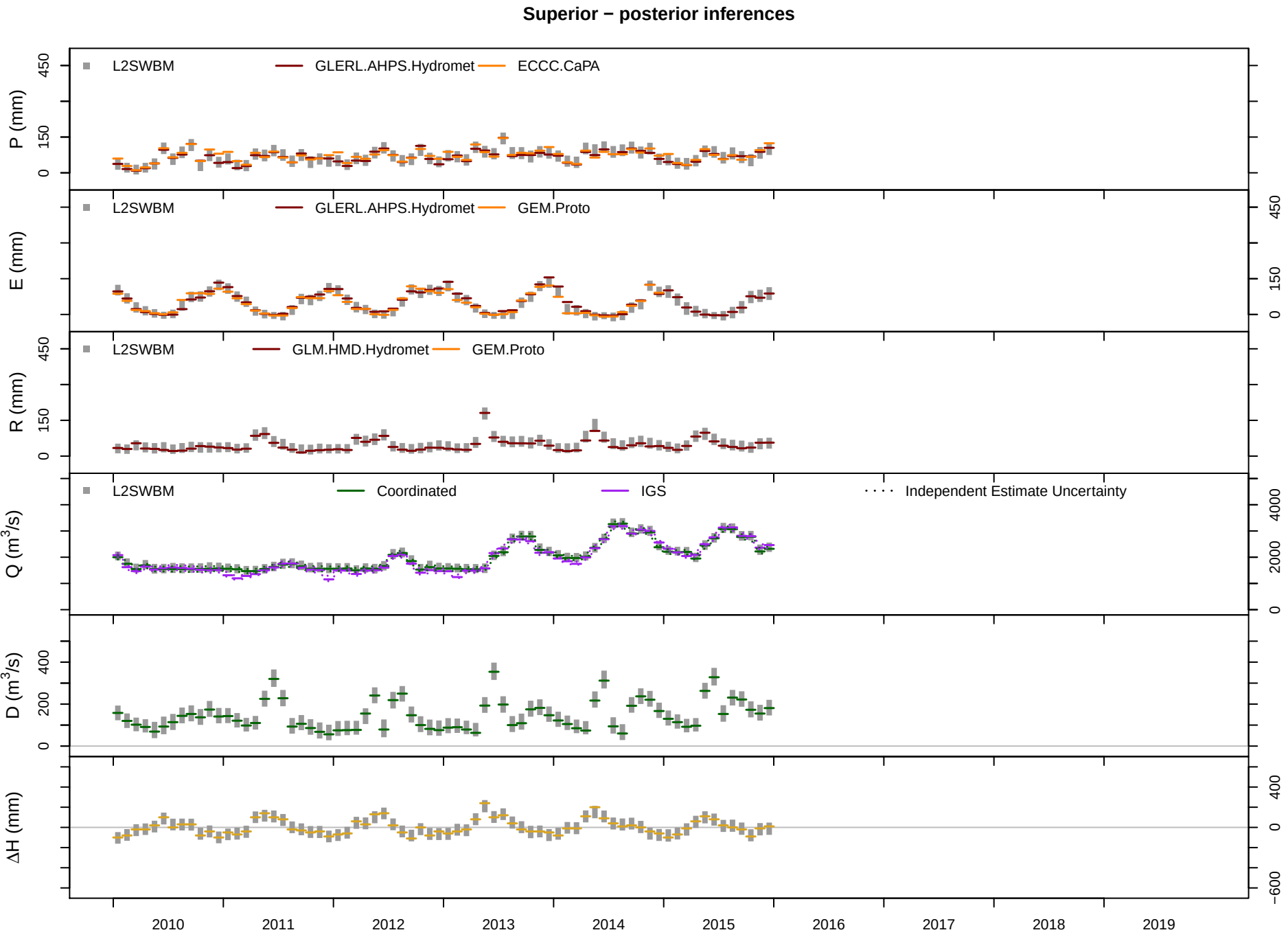
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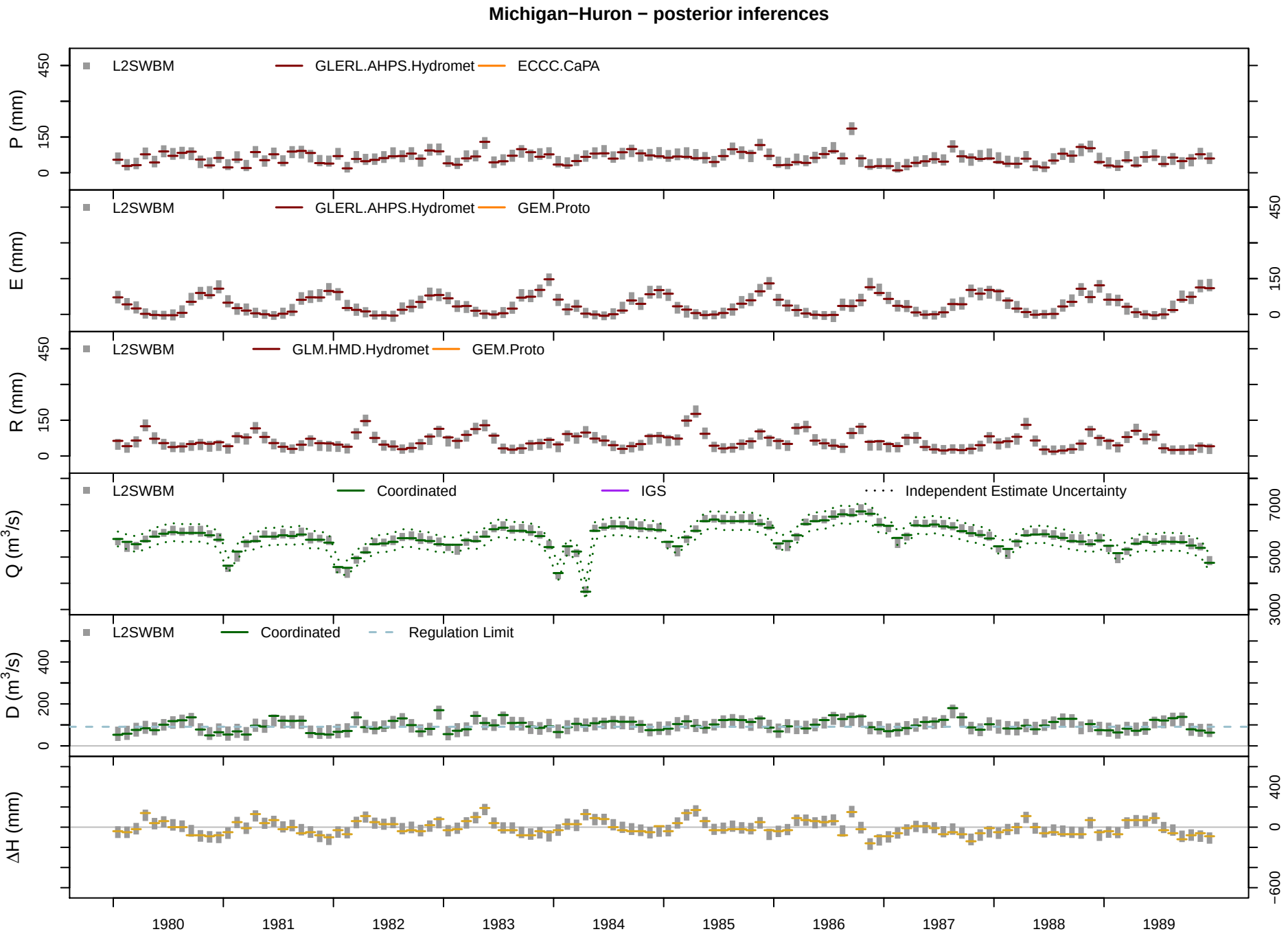
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E (mm)
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GEM.Proto
R (mm)
L2SWBM
GLM.HMD.Hydromet
GEM.Proto
Q (m3/s)
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IGS
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D (m3/s)
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Coordinated
Regulation Limit
ΔH (mm)
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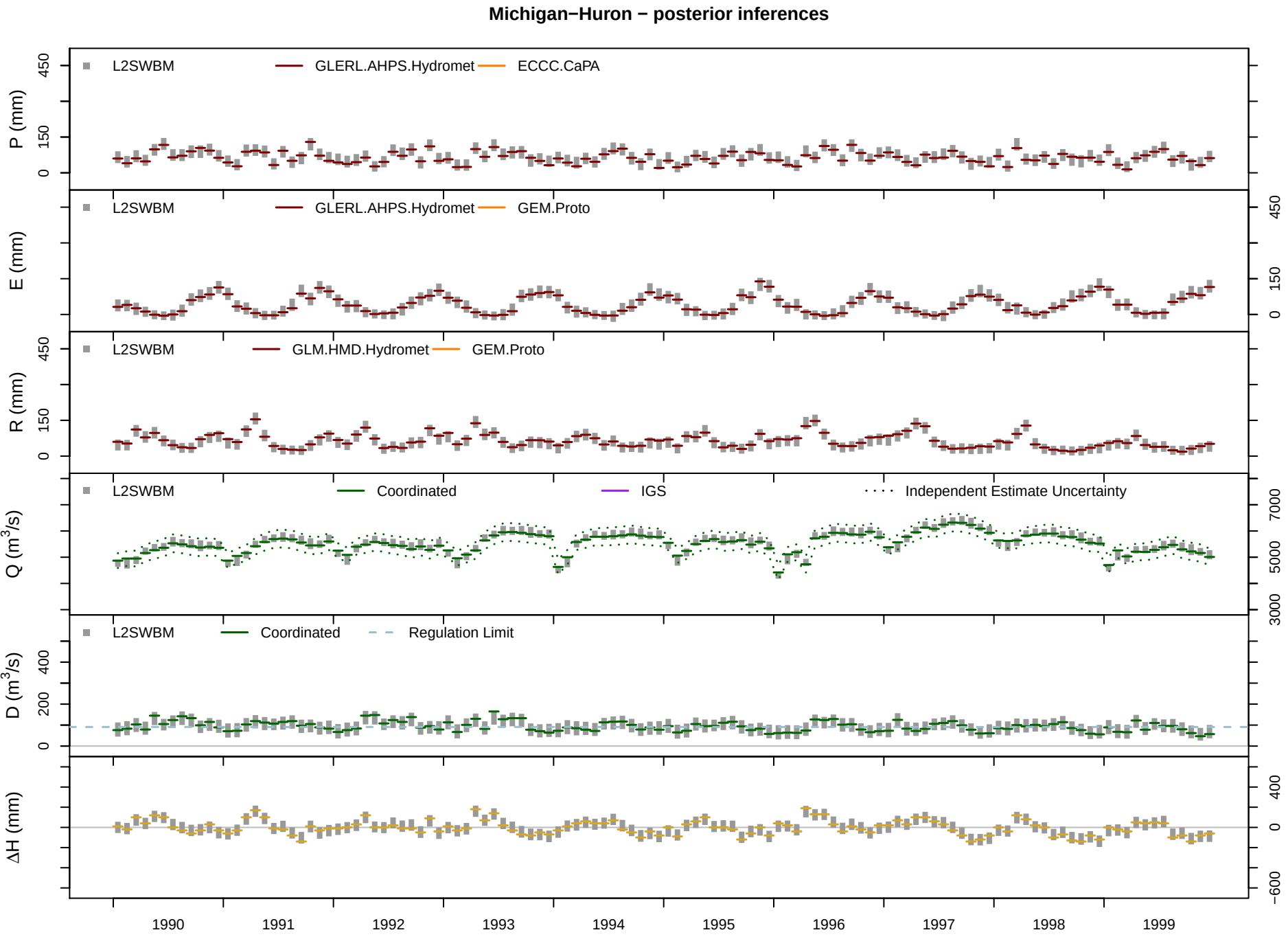
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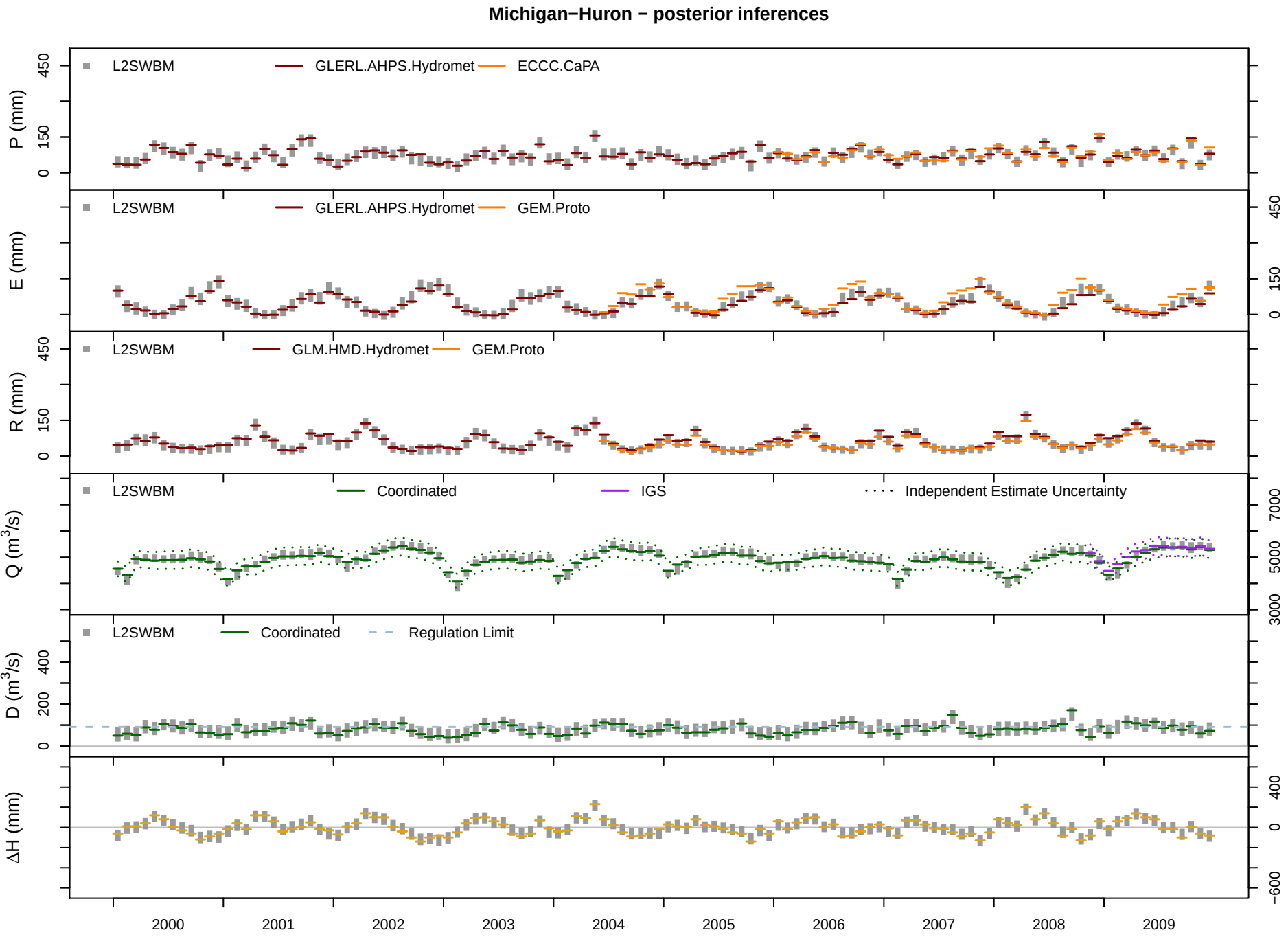
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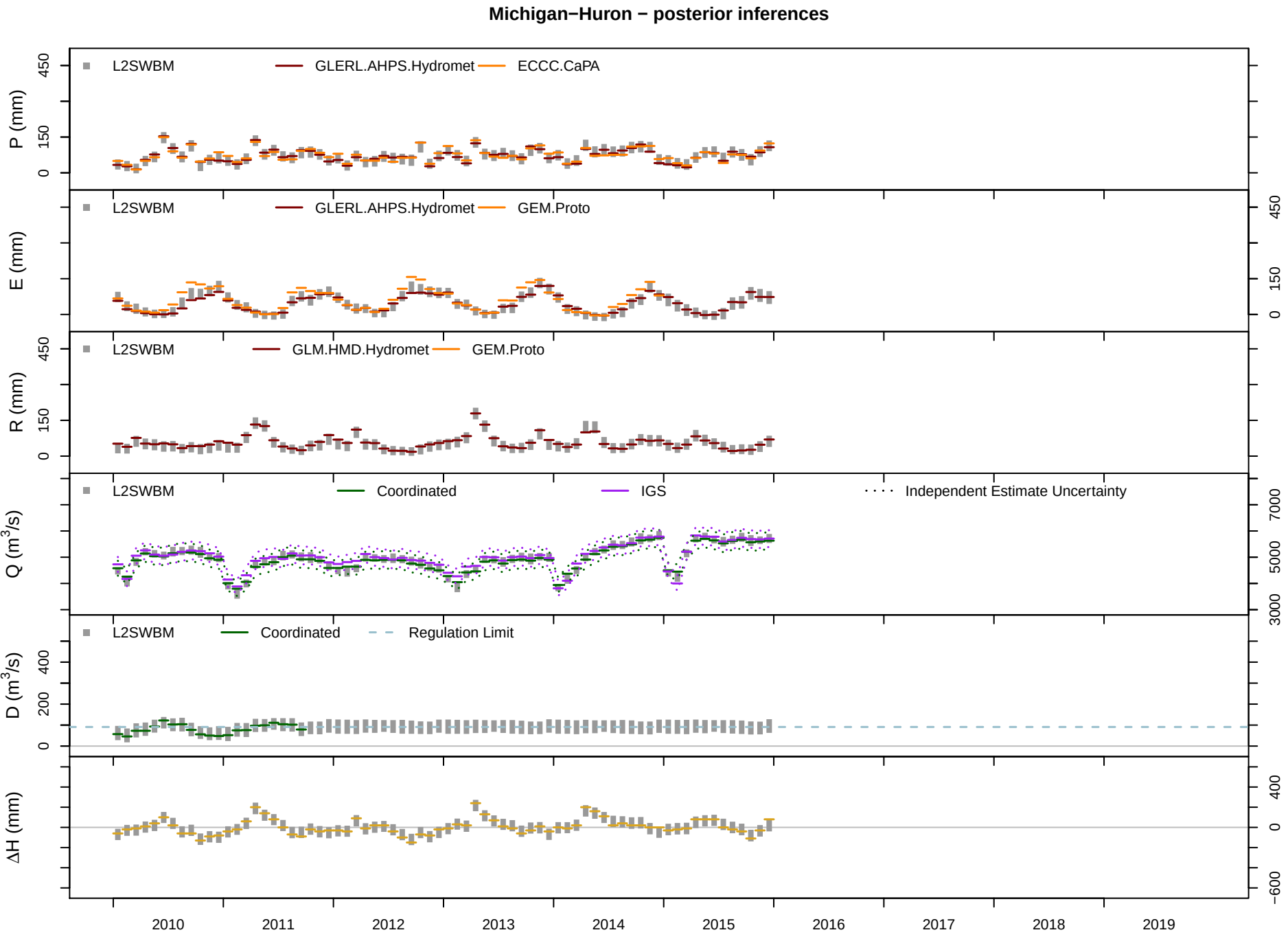
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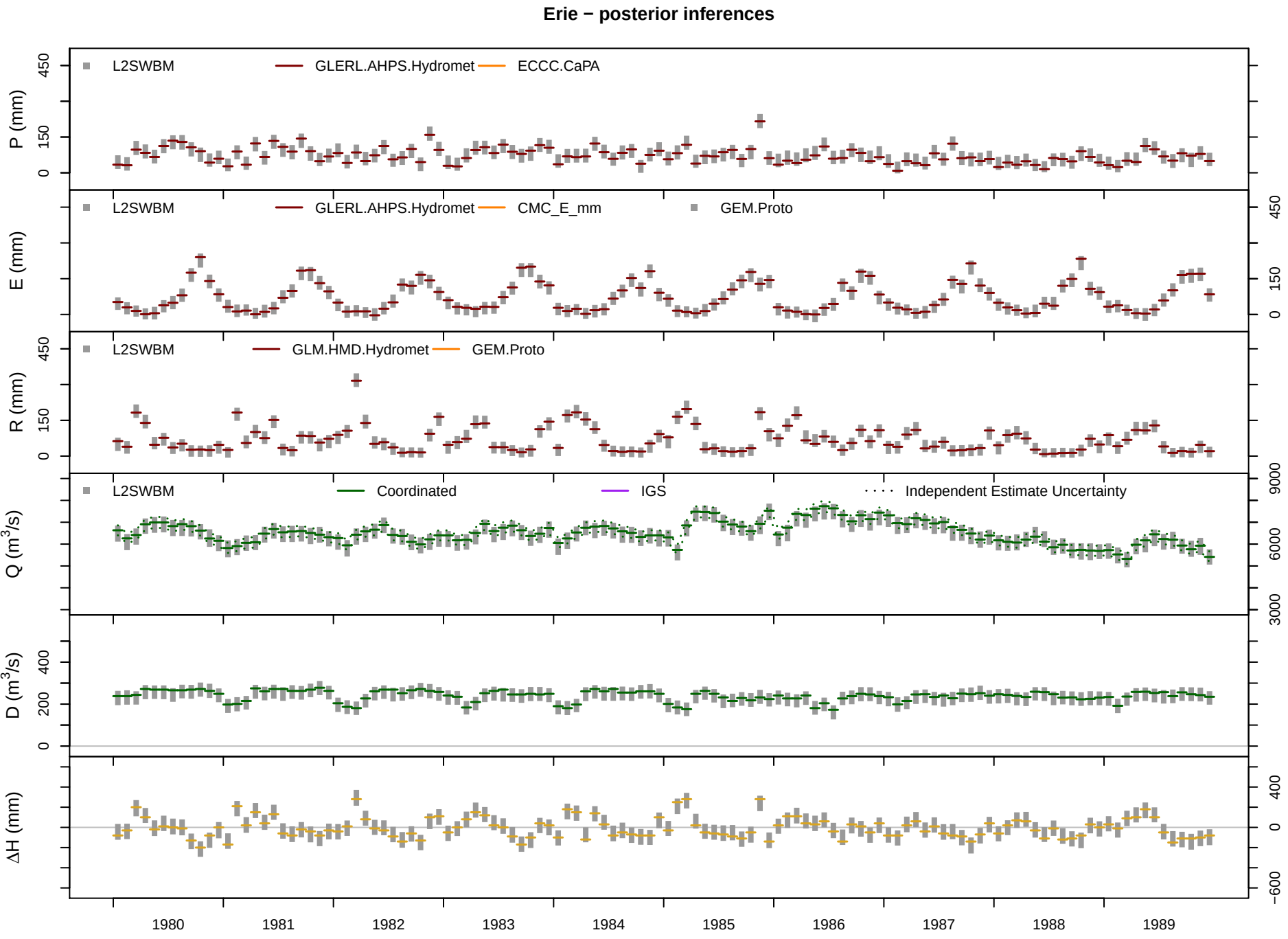
Erie − posterior inferences
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GLM.HMD.Hydromet
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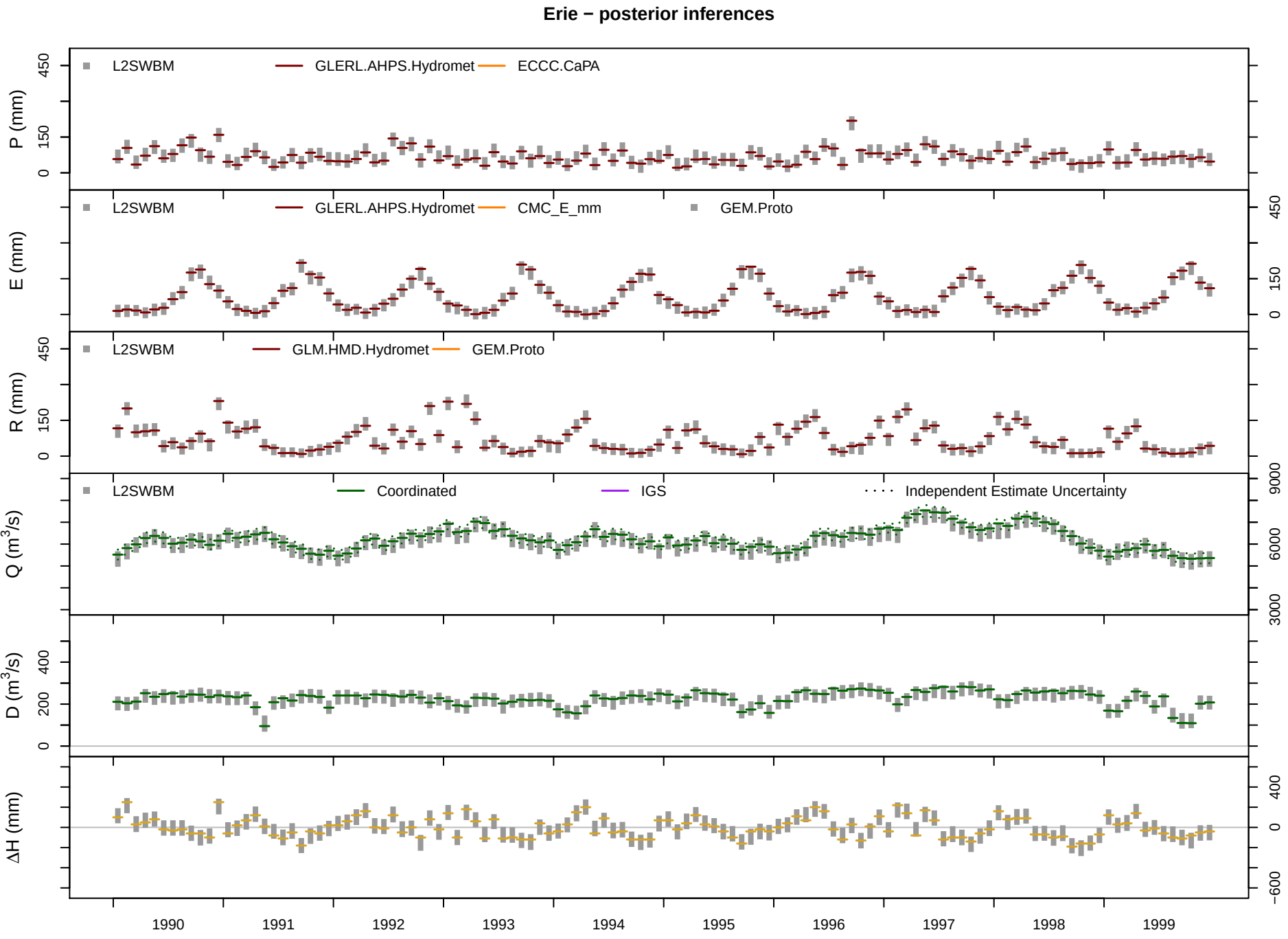
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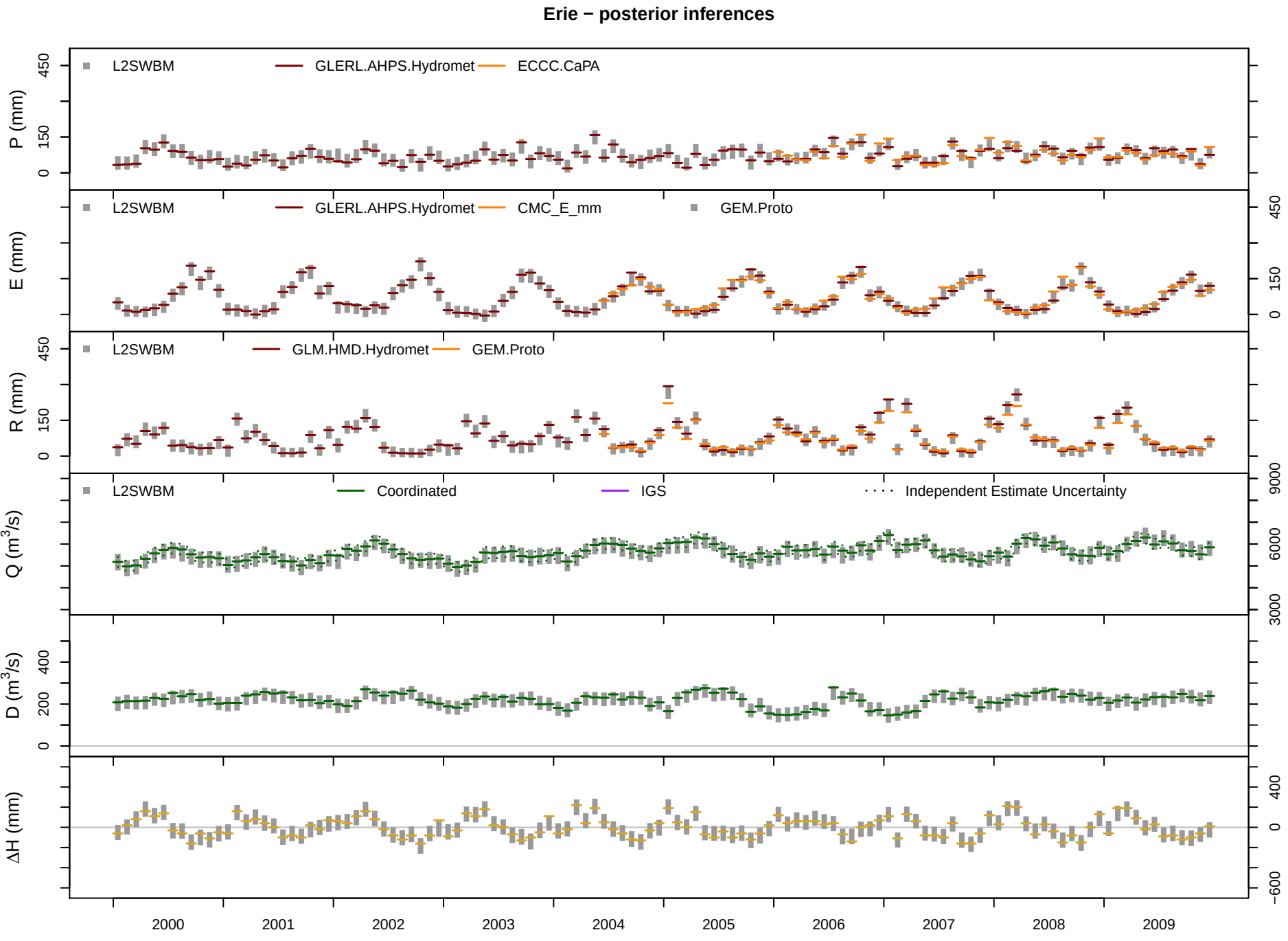
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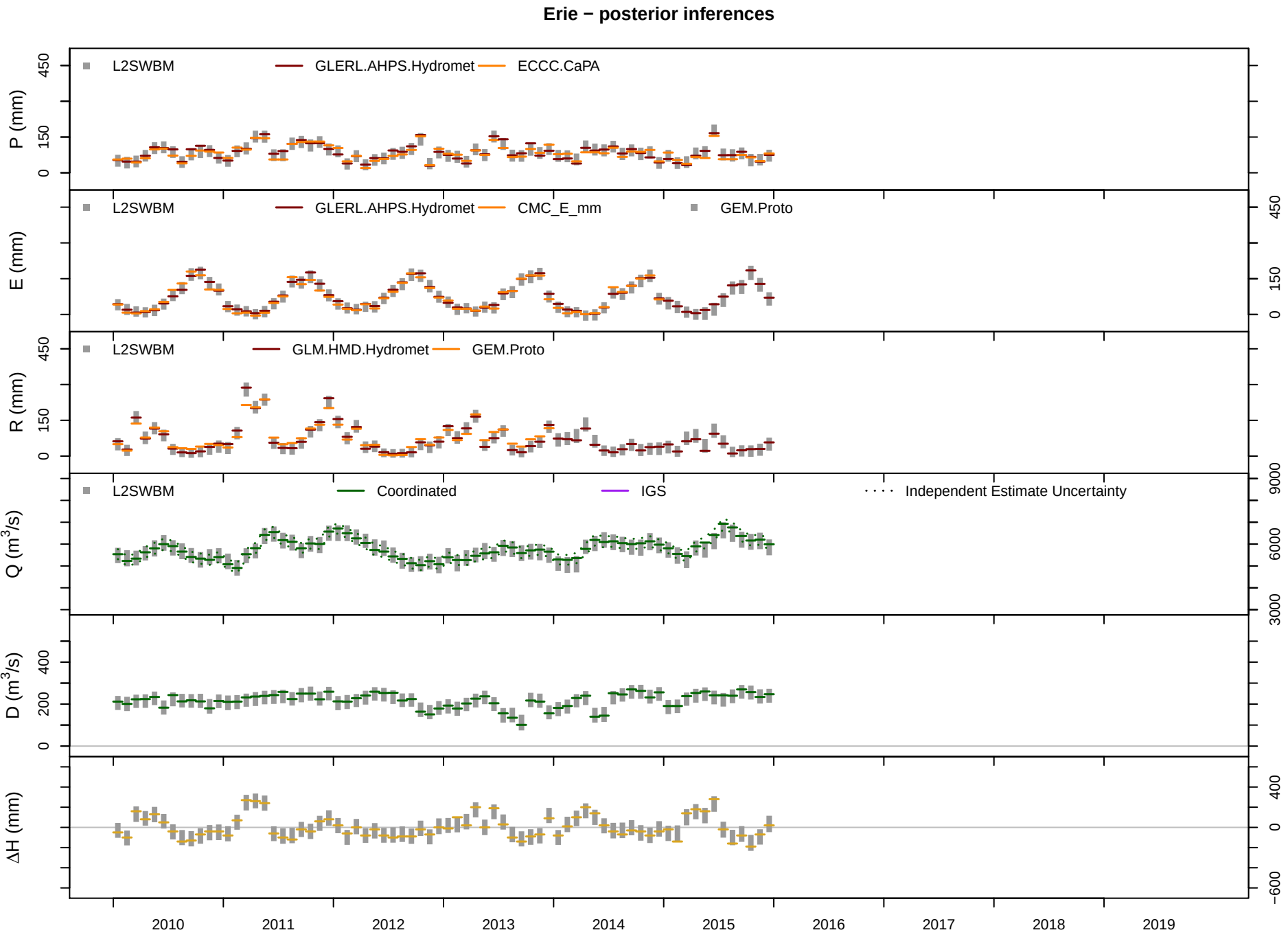
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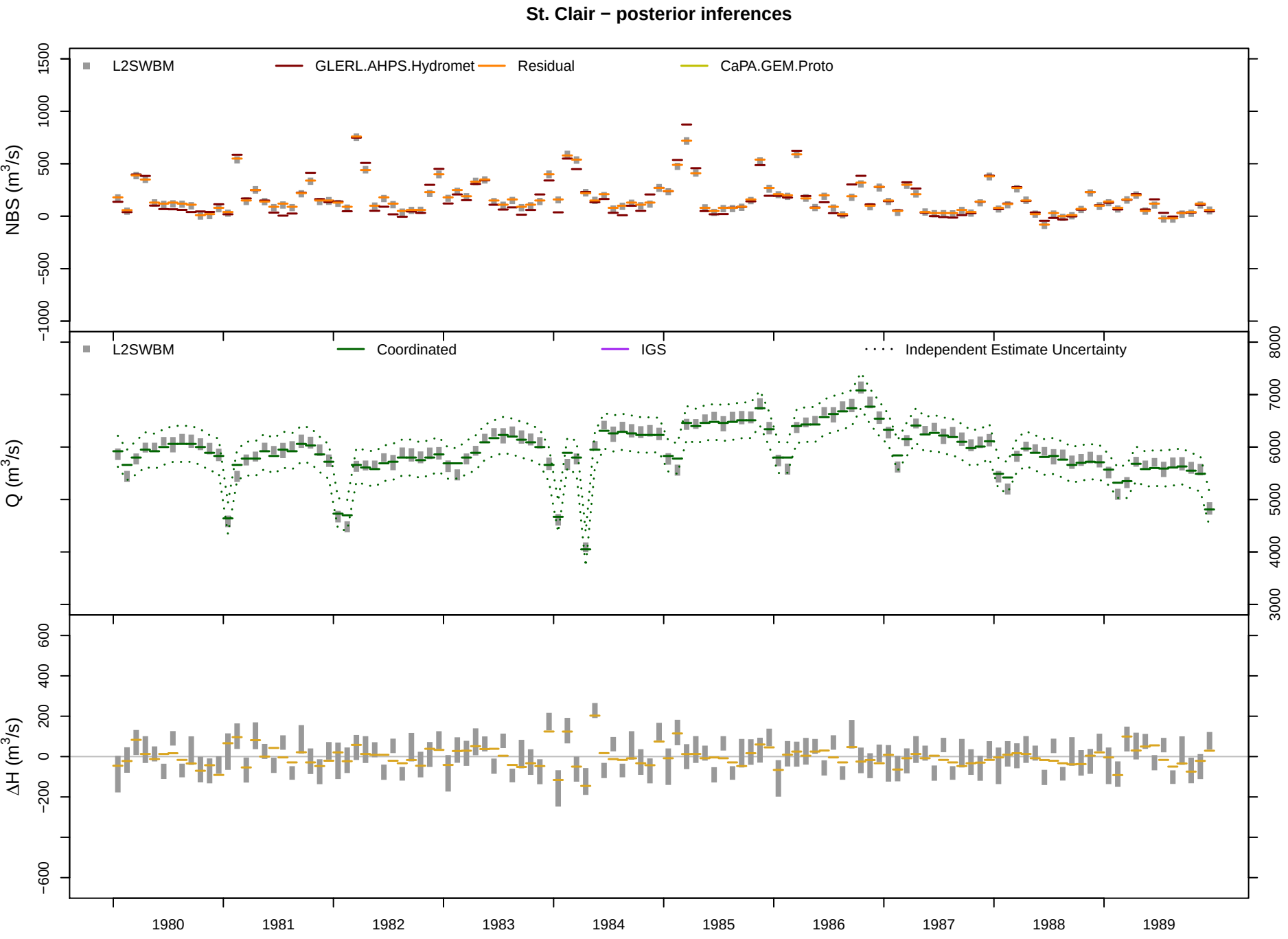
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L2SWBM
Coordinated
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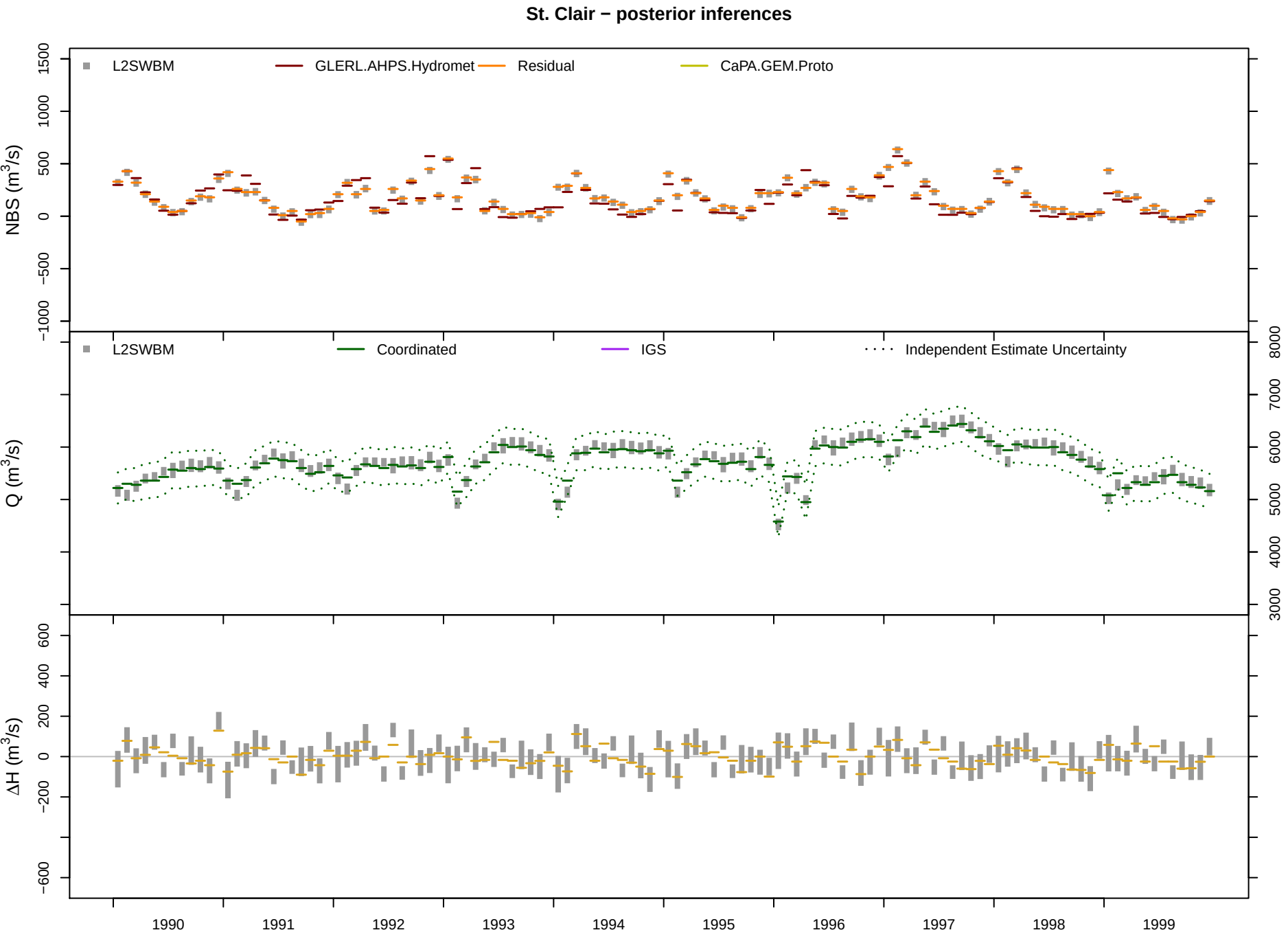
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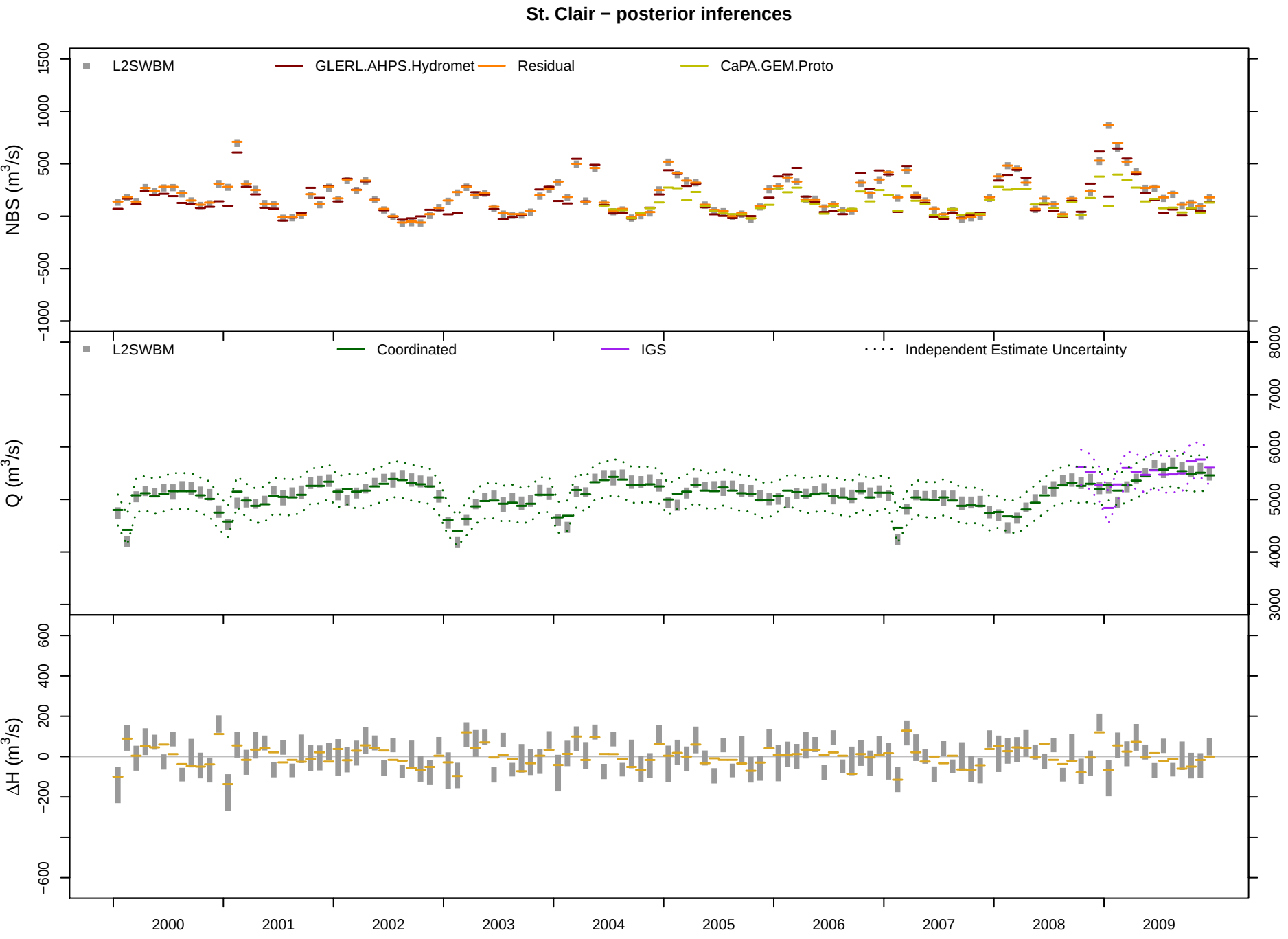
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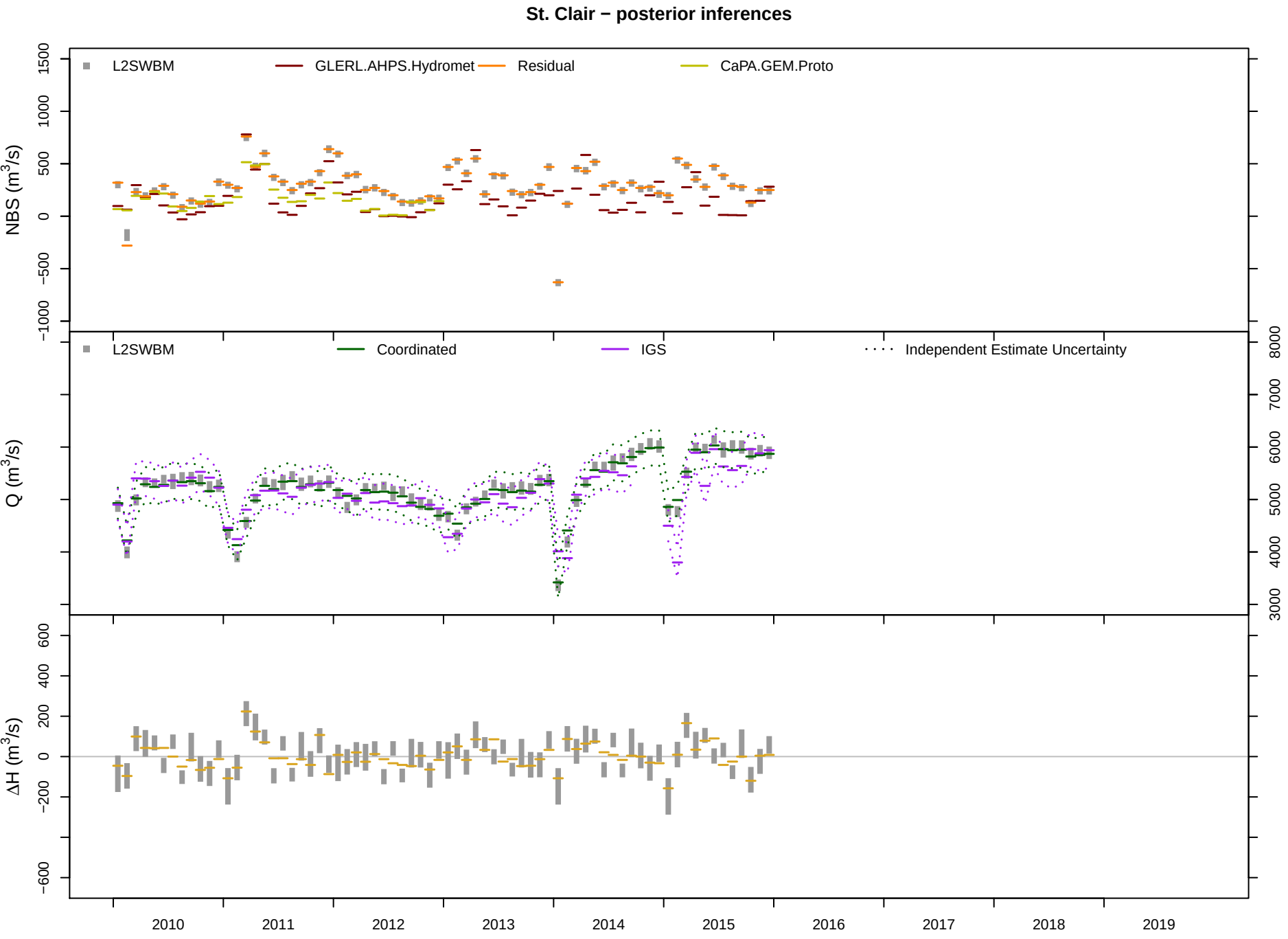
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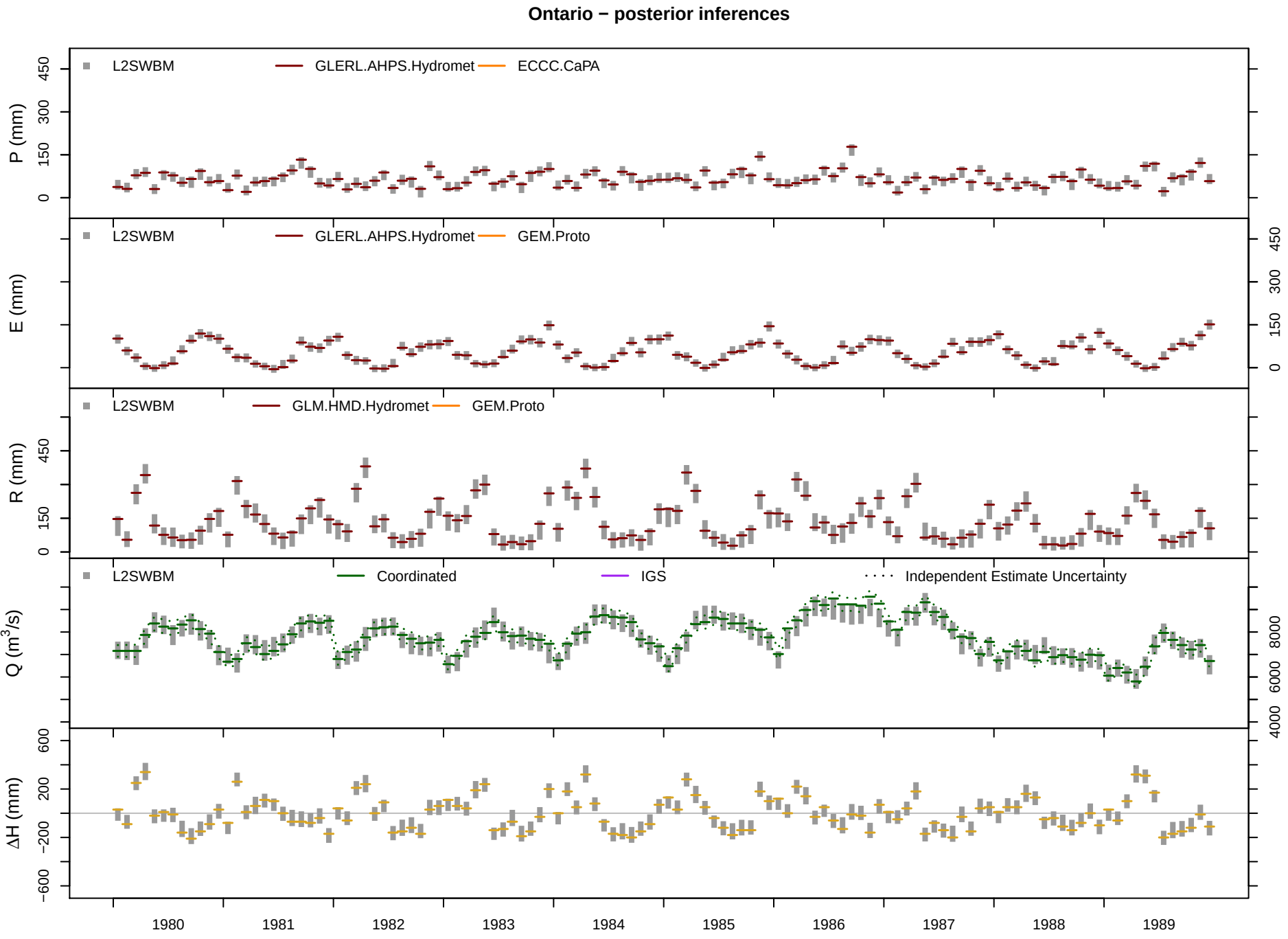
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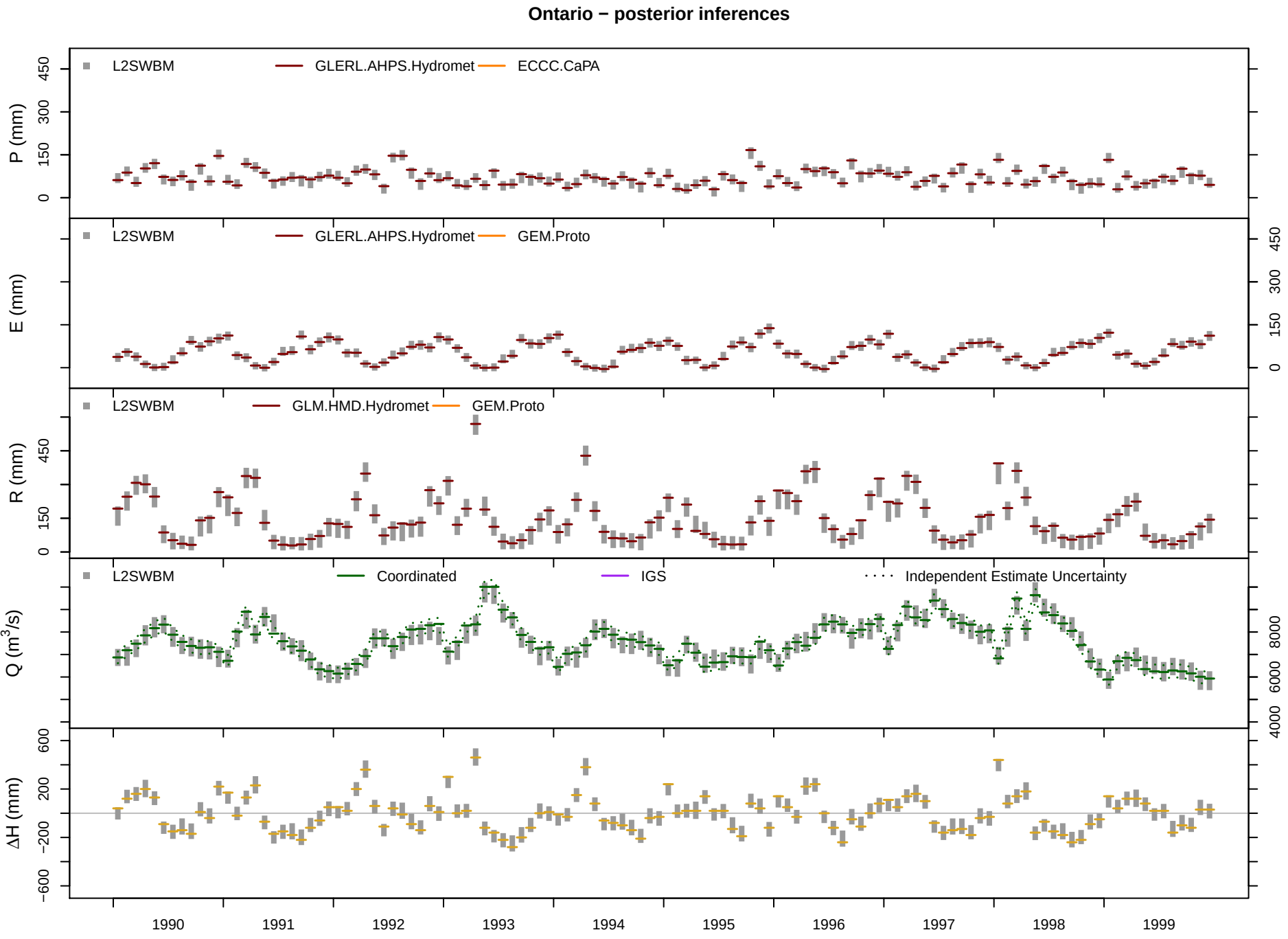
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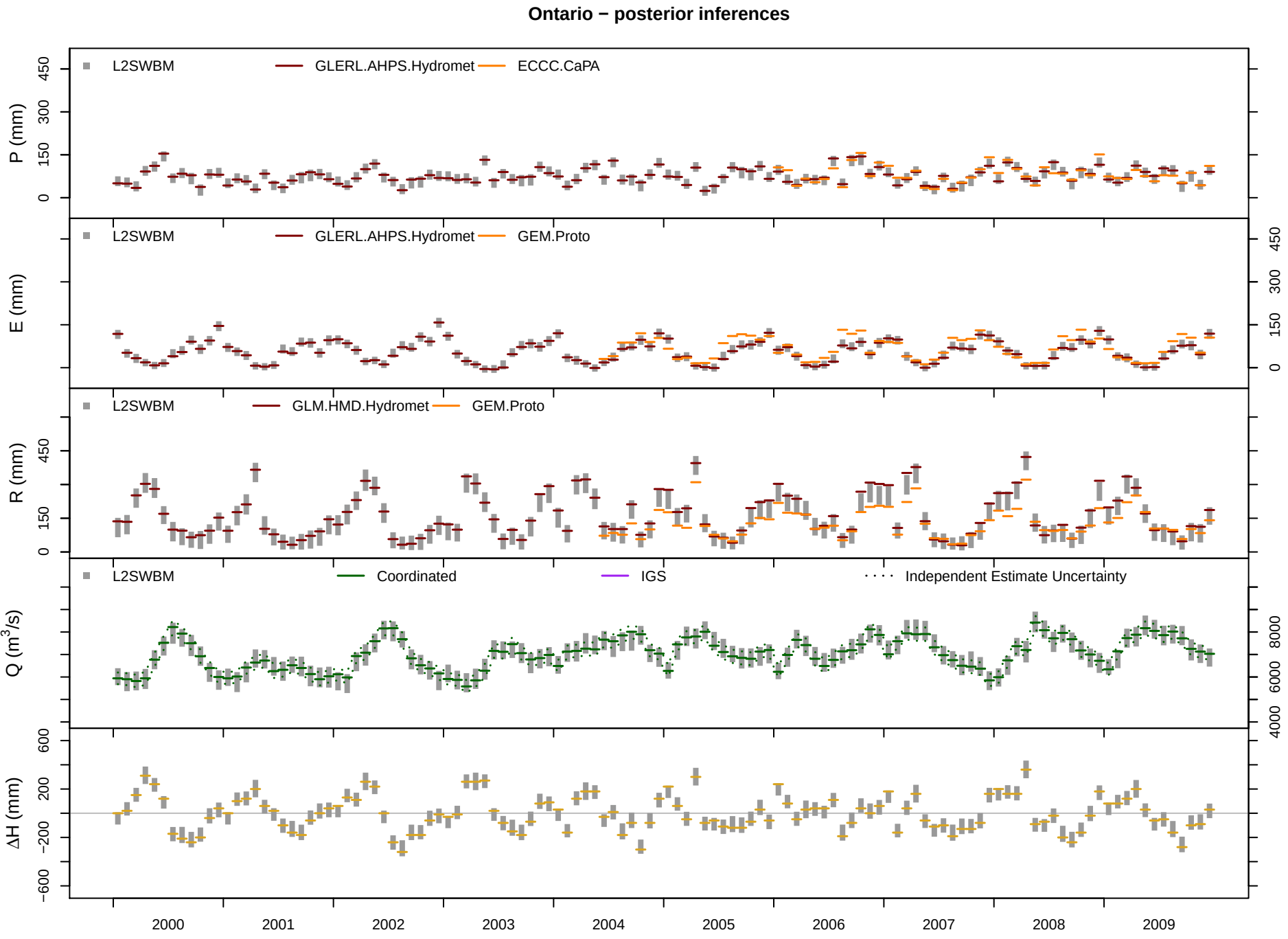
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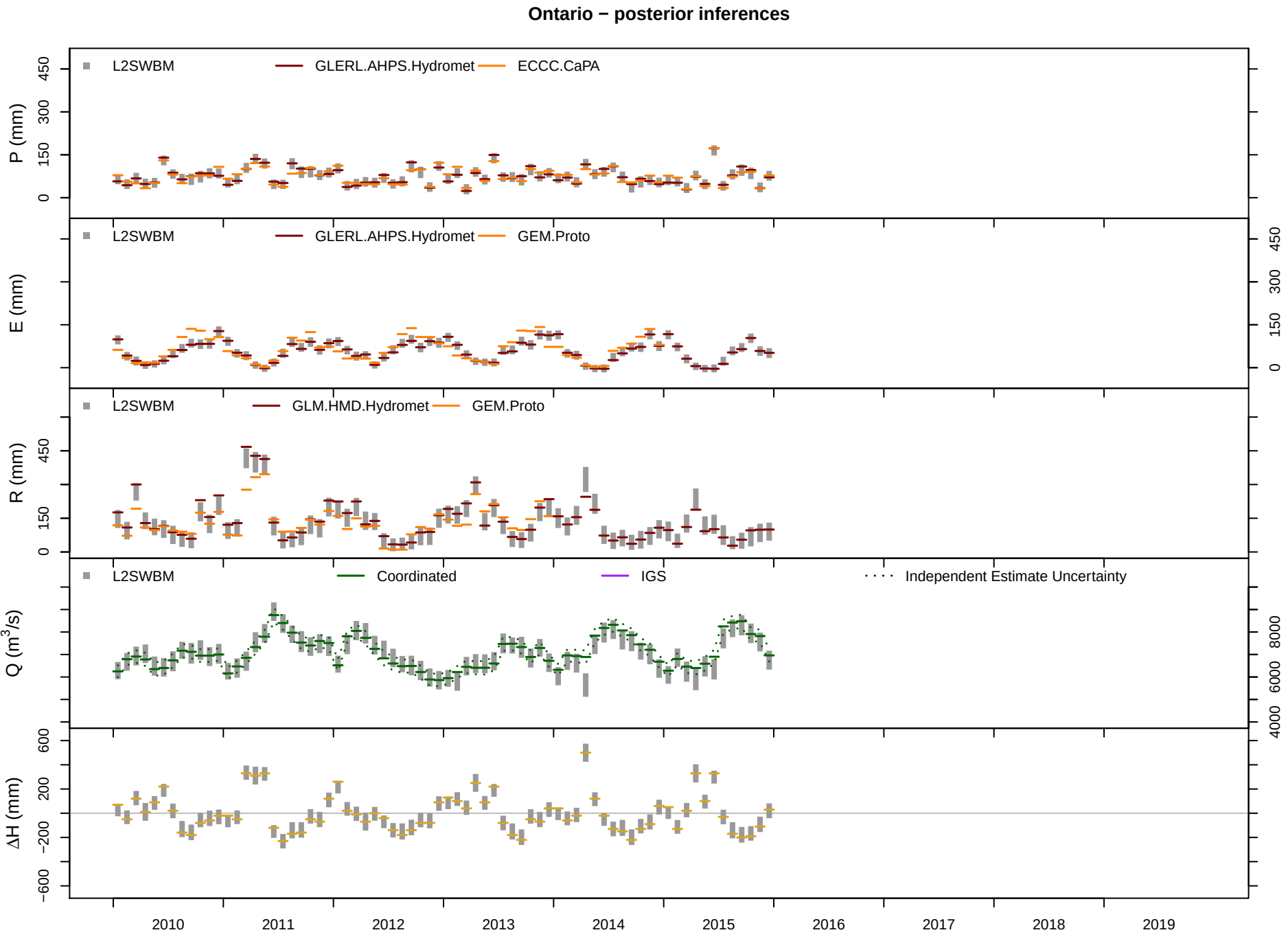
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