



SIRGAS y el terremoto del 27 de febrero de 2010 en Chile

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Munich, marzo 17 de 2010.

El 27 de febrero de 2010, a las 06:34 UTC (03:34 tiempo local) un fuerte terremoto (de magnitud 8.8) estremeció la región occidental de Chile. El epicentro se ubicó en la latitud 35.846°S con longitud 72.719°W , a una profundidad aproximada de 35 km. Con el propósito de evaluar el impacto de este sismo en el marco de referencia SIRGAS, se calcularon posiciones diarias para una selección de estaciones SIRGAS-CON entre el 21 de febrero y el 6 de marzo de 2010. Este procesamiento incluyó como puntos fiduciales estaciones del marco de referencia global IGS05 ubicadas en América del Norte, Europa, África y Antártica (Fig. 1).

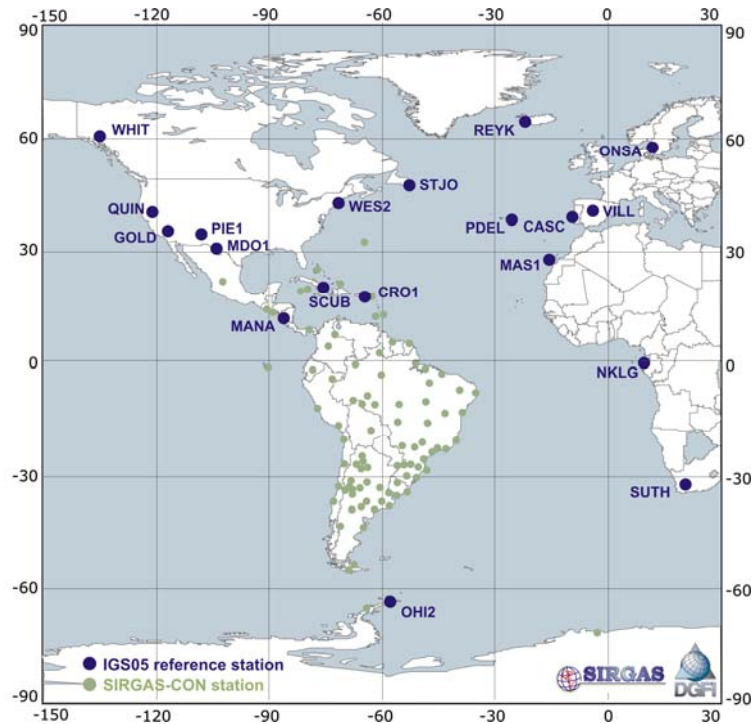


Fig. 1. Estaciones fiduciales IGS05 utilizadas para la realización del datum geodésico.

Los mayores desplazamientos se presentan entre las latitudes 30°S y 40°S desde la costa pacífica hasta la costa atlántica (Fig. 2). La serie de tiempo de la estación CONZ muestra un desplazamiento inicial de 2,9 m (el 27-02-2010) y movimientos adicionales postsísmicos mayores que 10 cm en la semana siguiente al evento principal (Fig. 3). Igualmente, se observan cambios verticales significativos en Concepción, Santiago, Valparaíso y en la Provincia de Mendoza (Argentina). Las estaciones ubicadas al oeste de los Andes se movieron hacia abajo, mientras que las ubicadas al este se movieron hacia arriba (Fig. 3).

En total, 23 estaciones de referencia SIRGAS-CON presentan movimientos superiores a 1,5 cm (Tabla 1): ANTC (Antuco, Chile), AZUL (Azul, Argentina), BCAR (Balcarce, Argentina), CFAG (Caucete, Argentina), CONZ (Concepción, Chile), CSLO (Complejo Astronómico El Leoncito, Argentina), IGM1 (Buenos Aires, Argentina), LHCL (Lihuel Calel, Argentina), LPGS (La Plata, Argentina), MA01 (Neuquen, Argentina), MZAS (San Rafael, Argentina), MZAC (Mendoza, Argentina), MZAE (Santa Rosa, Mendoza, Argentina), RWSN (Rawson, Argentina), SANT (Santiago, Chile), SL01 (La Punta, Argentina), SRLP (Santa Rosa, La Pampa, Argentina), UCOR (Córdoba, Argentina), UNRO (Rosario, Argentina), UNSJ (San Juan, Argentina), UYMO (Montevideo, Uruguay), VALP (Valparaíso, Chile), VBCA (Bahía Blanca, Argentina). El anexo incluye las series de tiempo correspondientes.

Este procesamiento fue adelantado por el Centro de Análisis SIRGAS operado por el DGFI (*Deutsches Geodätisches Forschungsinstitut*) y está basado en las observaciones puestas a disposición por el IGS (*International GNSS Service*, www.igs.org) y los Centros Operadores y Centros Nacionales de Datos Latinoamericanos que contribuyen con la red de operación continua SIRGAS-CON (www.sirgas.org). Este apoyo es altamente reconocido y agradecido.

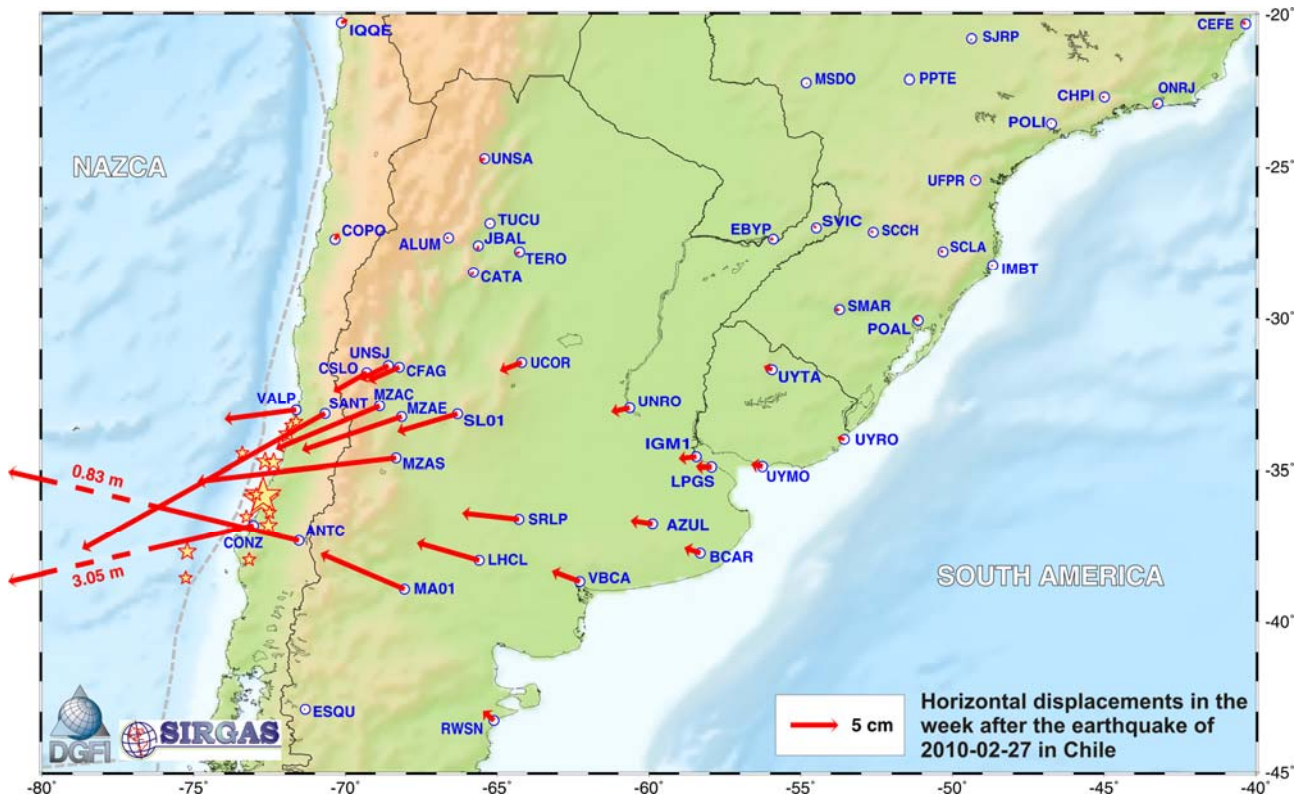


Fig. 2. Movimientos horizontales estimados en la semana posterior al sismo del 2010-02-27 en Chile.

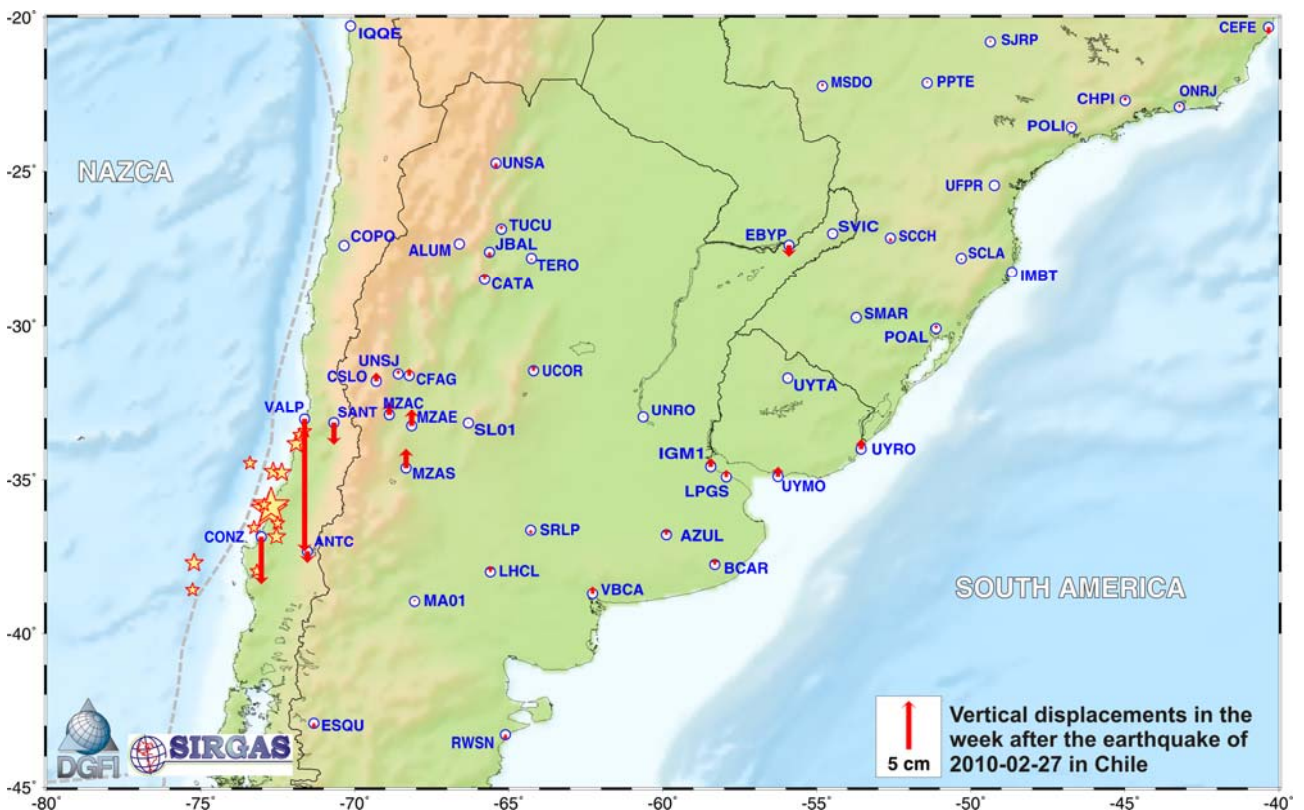


Fig. 3. Movimientos verticales estimados en la semana posterior al sismo del 2010-02-27 en Chile.

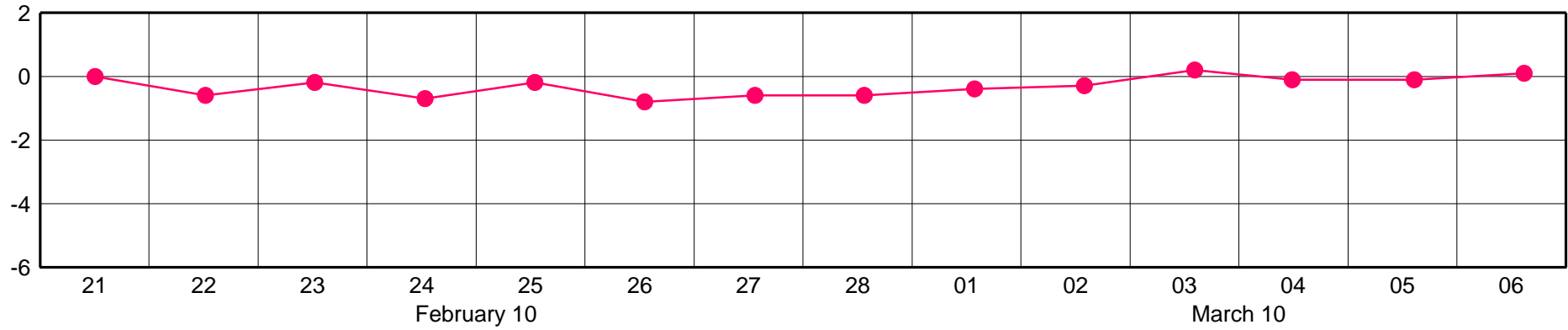


Tabla 1. Residuos obtenidos al calcular una transformación de similitud entre las posiciones de las estaciones calculadas para las semanas 1572 (2010-02-24) y 1573 (2010-03-03).
Para la estación ANTC se utilizaron las posiciones de la semana 1539 (2009-07-08).

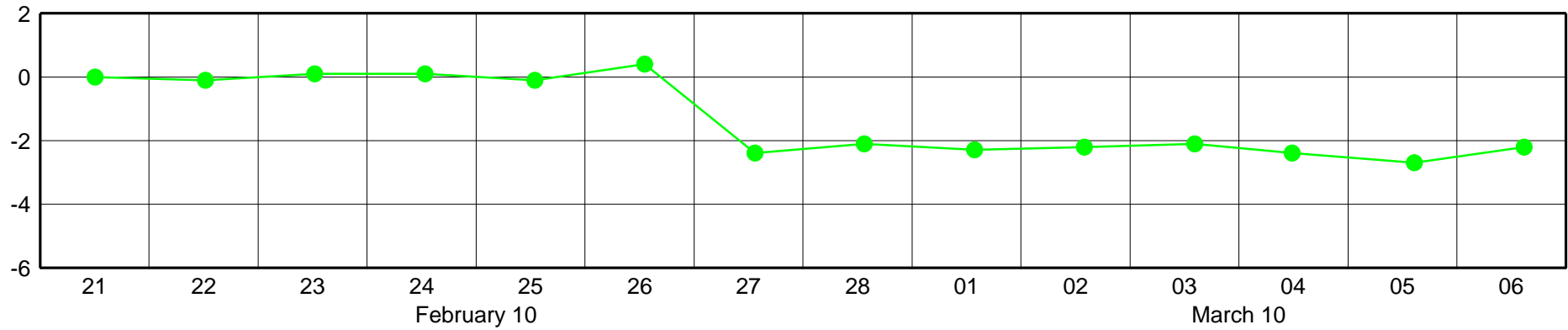
Station	Residuals		
	N [mm]	E [mm]	Up [mm]
ANTC 41713S001	195	-808	-12
AZUL 41529M001	1	-23	3
BCAR 41539M001	3	-16	3
CFAG 41517S001	-18	-33	1
CONZ 41719M002	-682	-2977	-47
CSLO 41540M001	-21	-36	6
IGM1 41505M003	-5	-18	8
LHCL 41518S001	16	-66	4
LPGS 41510M001	-2	-17	-1
MA01 41542M001	37	-83	9
MZAC 41503M001	-48	-109	15
MZAE 41530M001	-39	-105	17
MZAS 41528M001	-27	-210	18
RWSN 41513M001	8	-10	3
SANT 41705M003	-145	-257	-21
SL01 41543M001	-21	-64	1
SRLP 41532M001	3	-58	8
UCOR 41502M001	-11	-22	1
UNRO 41525M001	-7	-19	-3
UNSJ 41527M001	-18	-29	-1
UYMO 42301M001	-1	-11	10
VALP 41712S001	-13	-76	-137
VBCA 41512M001	8	-30	4

AZUL-North [cm]

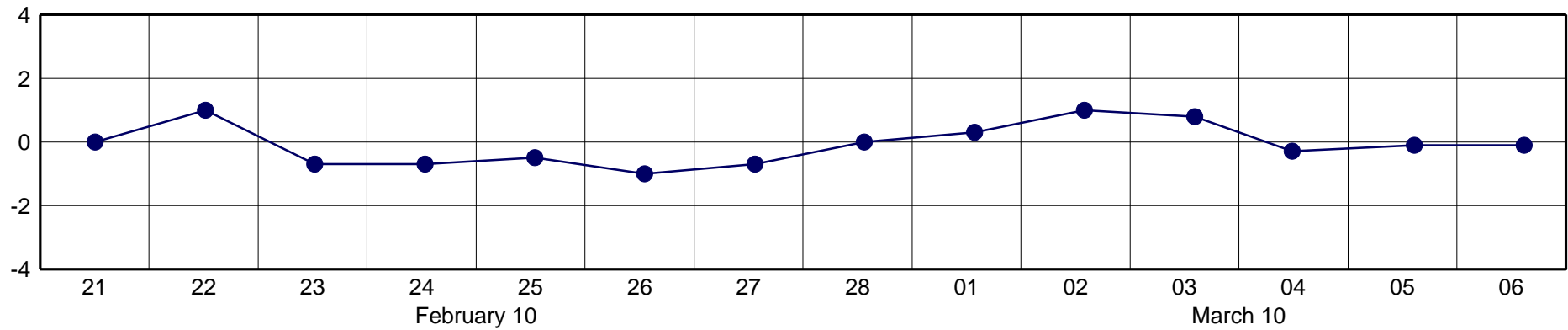
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AZUL-East [cm]

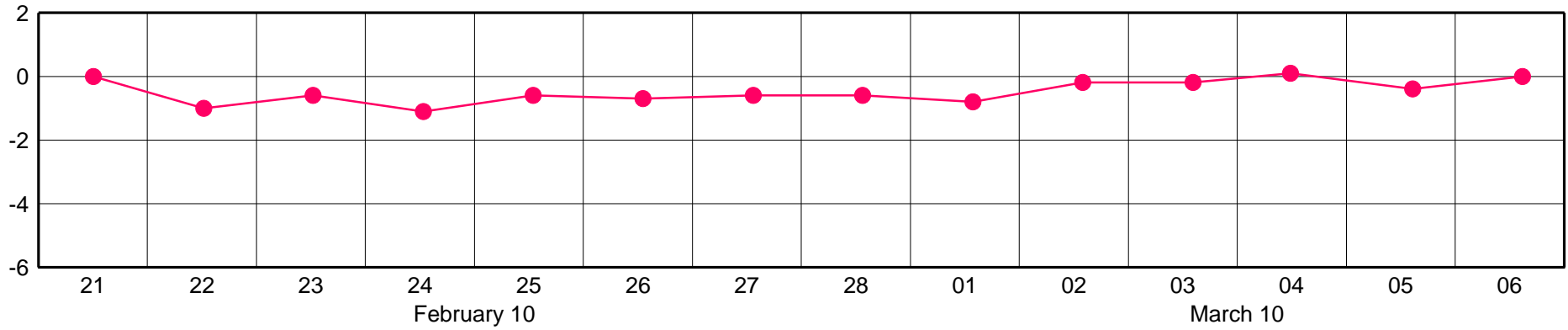


AZUL-Up [cm]

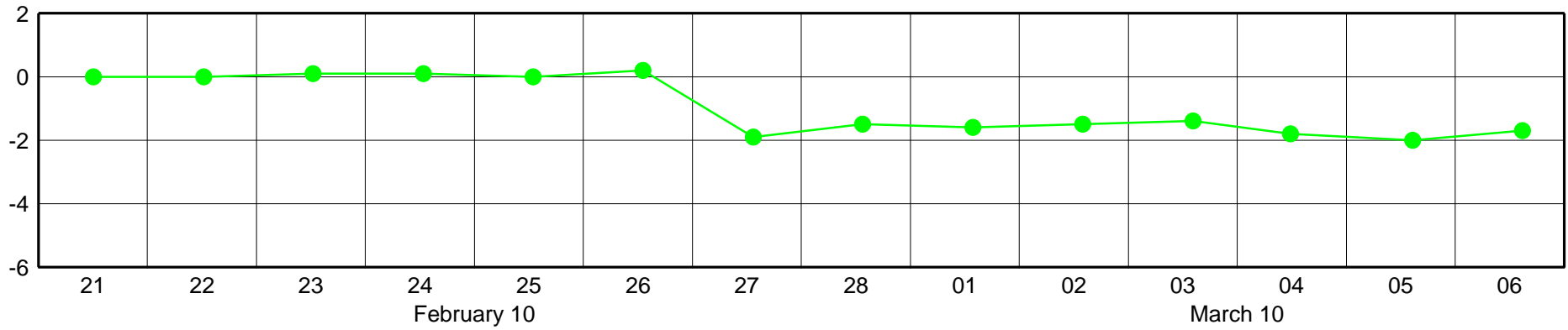


BCAR-North [cm]

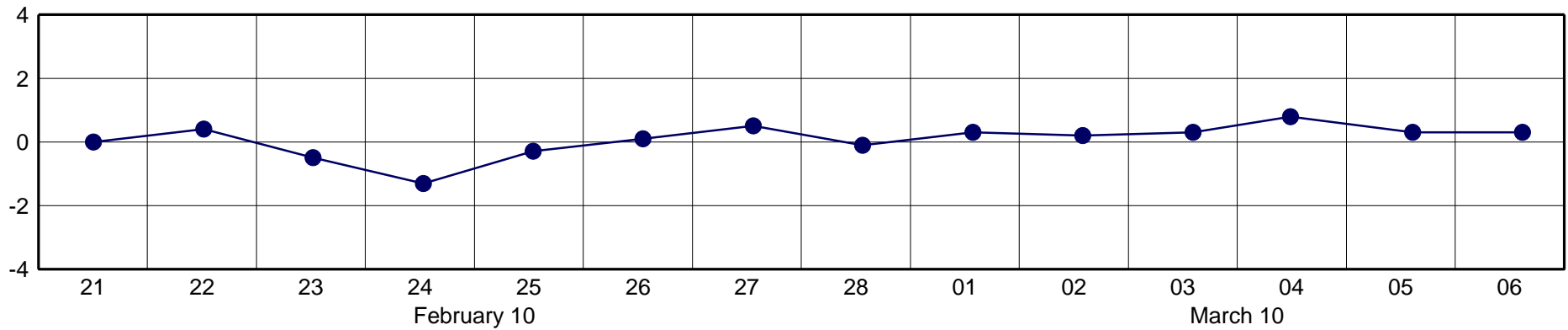
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BCAR-East [cm]

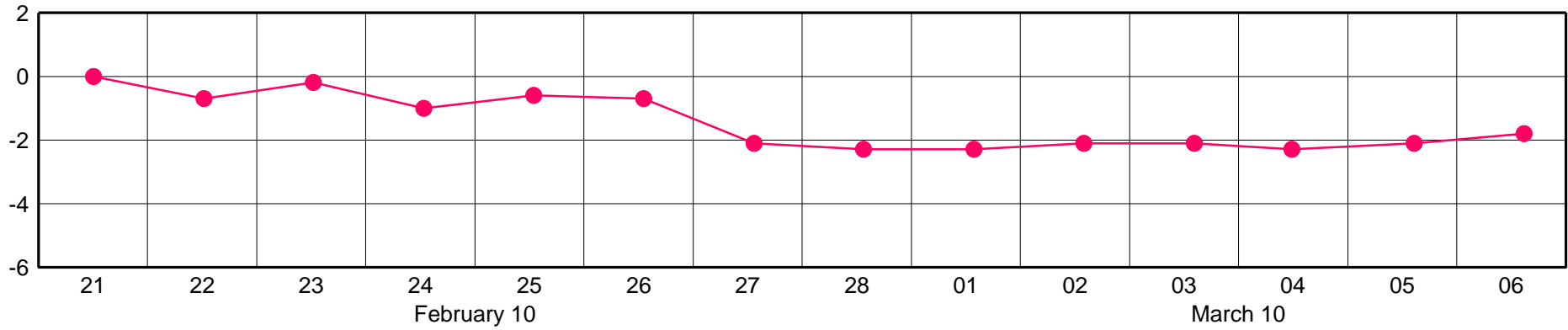


BCAR-Up [cm]

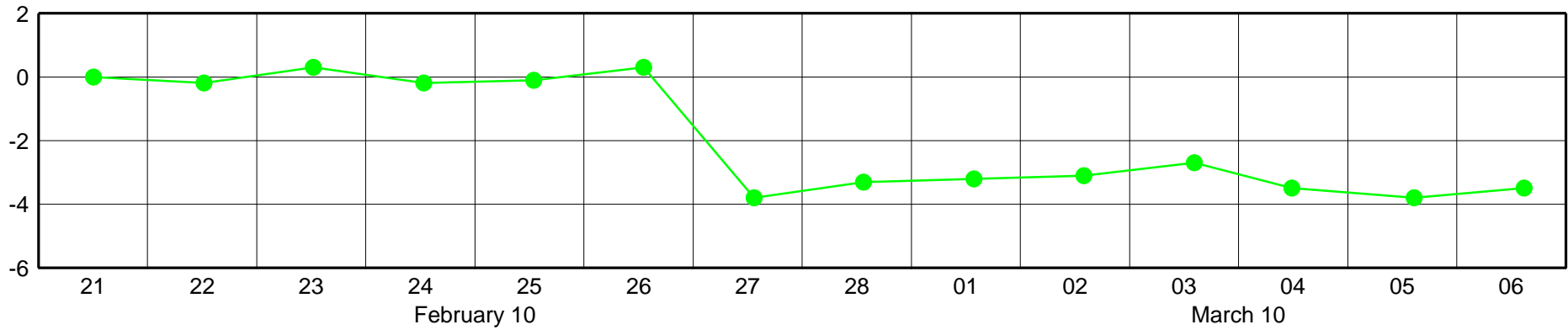


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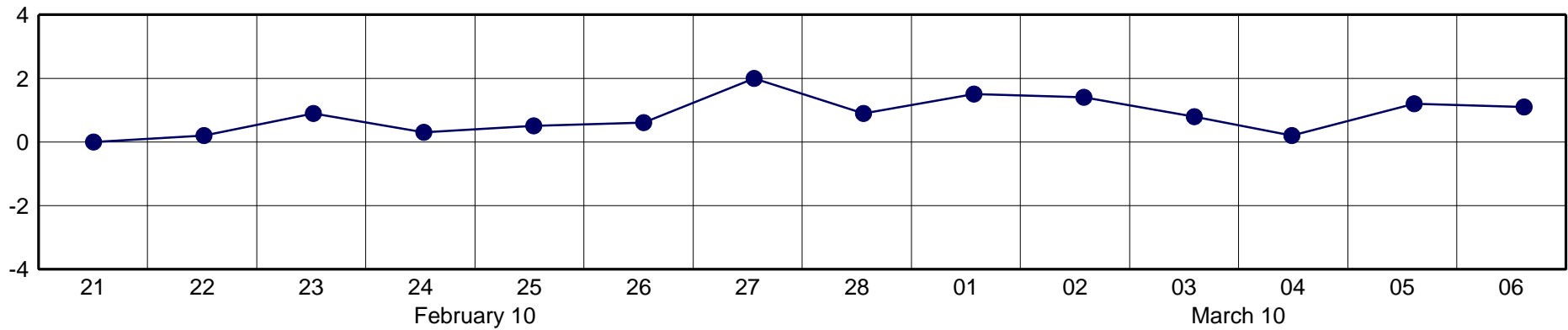
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CFAG-East [cm]

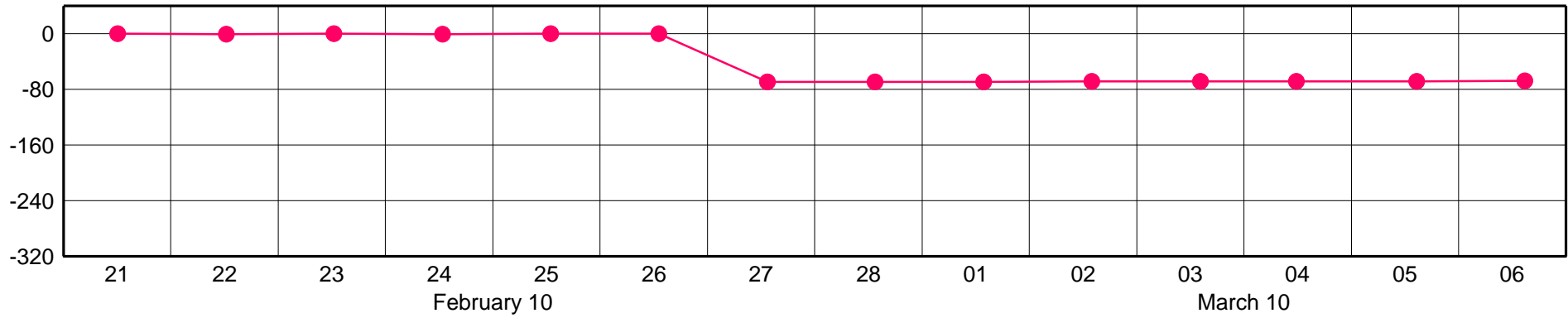


CFAG-Up [cm]

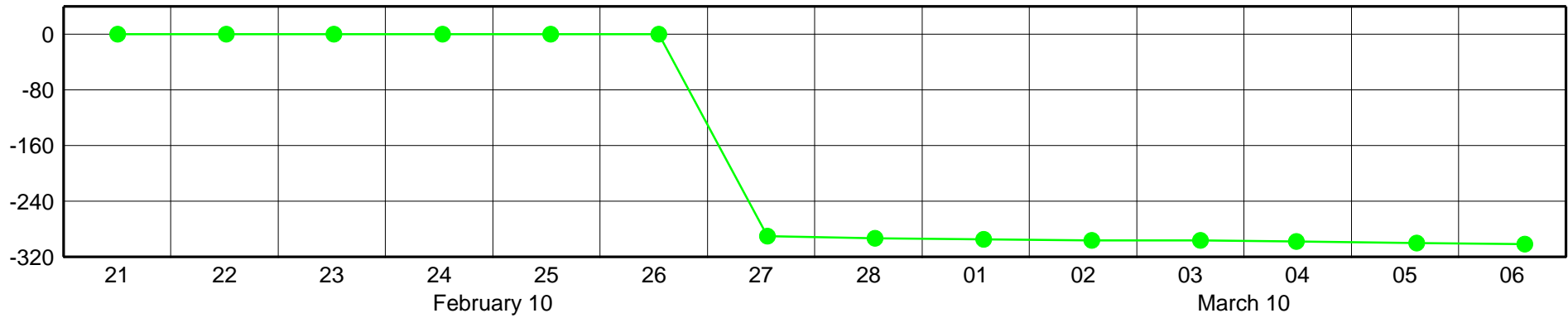


CONZ-North [cm]

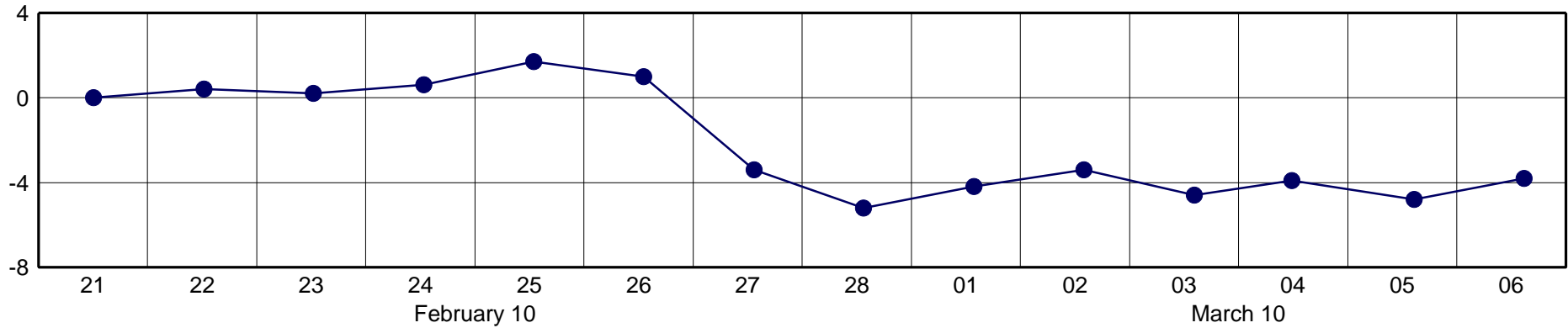
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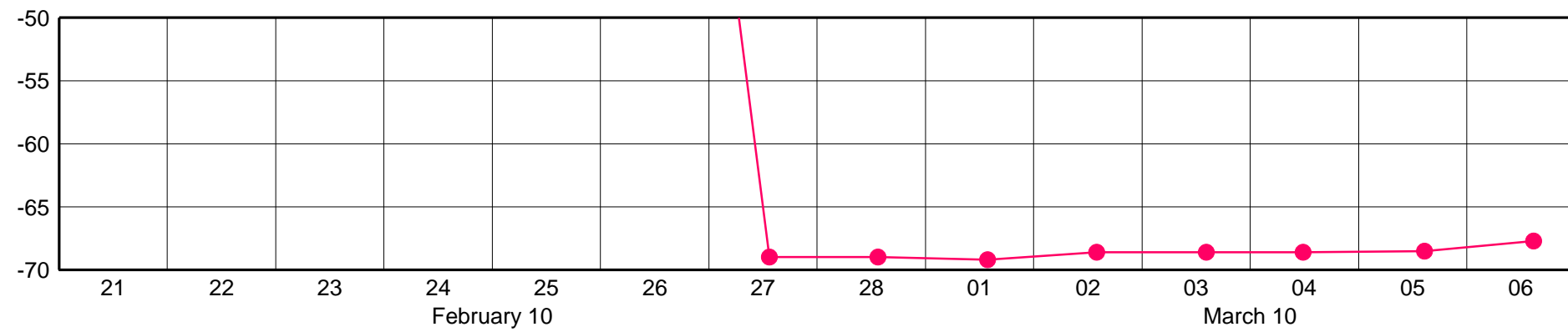
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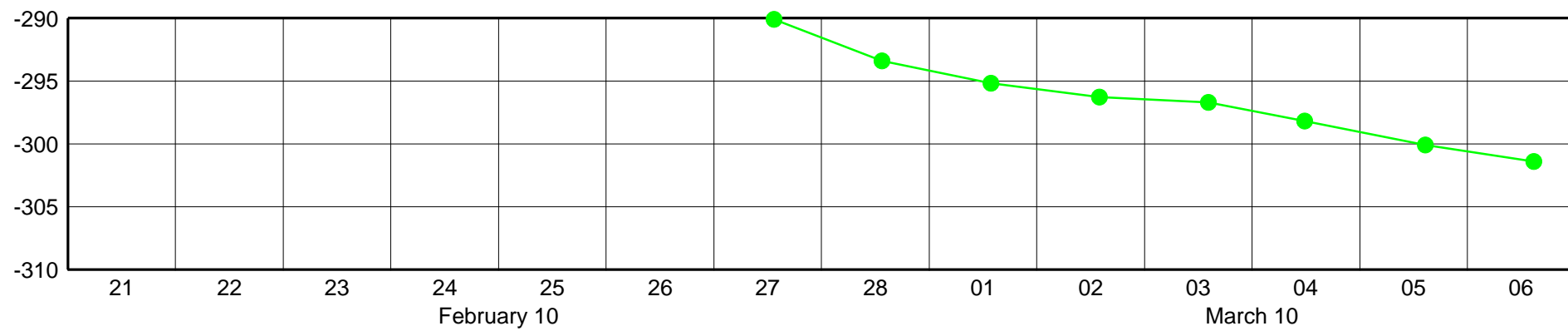
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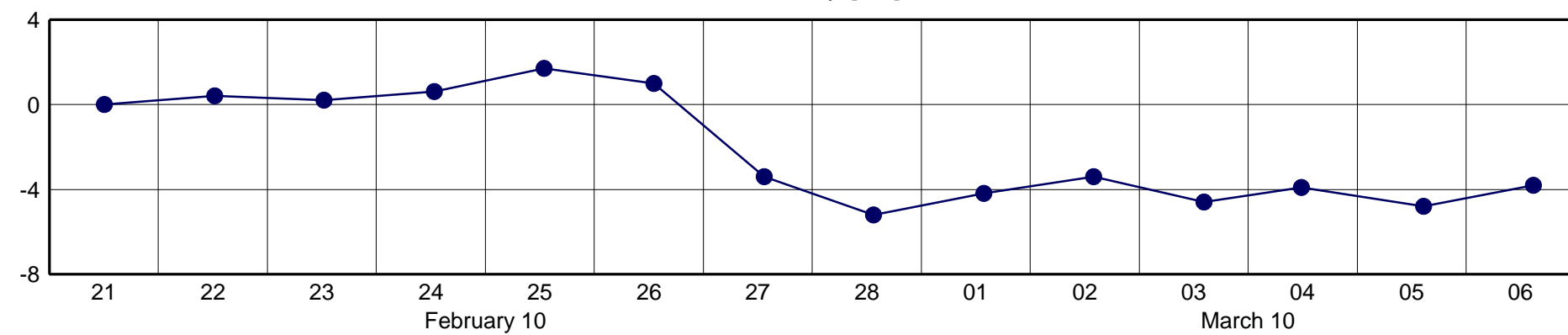
CONZ-North [cm]



CONZ-East [cm]

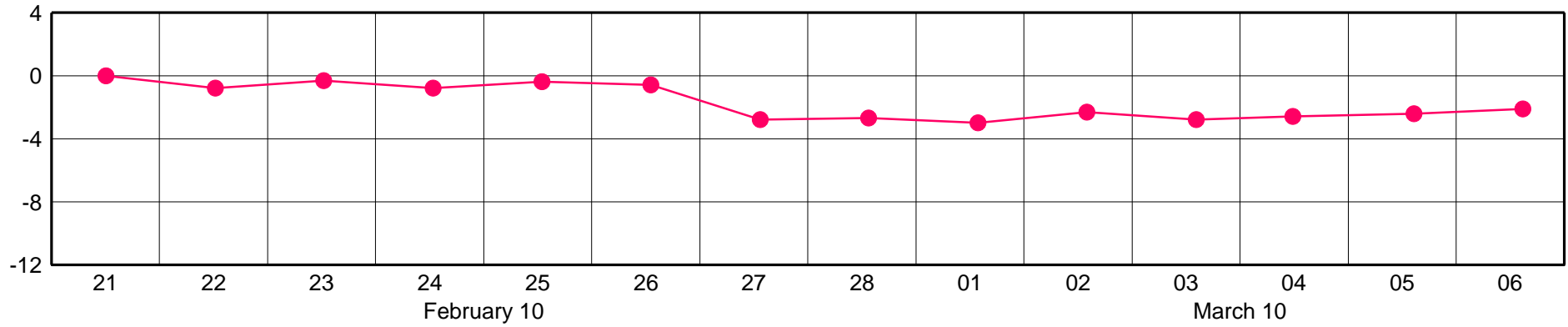


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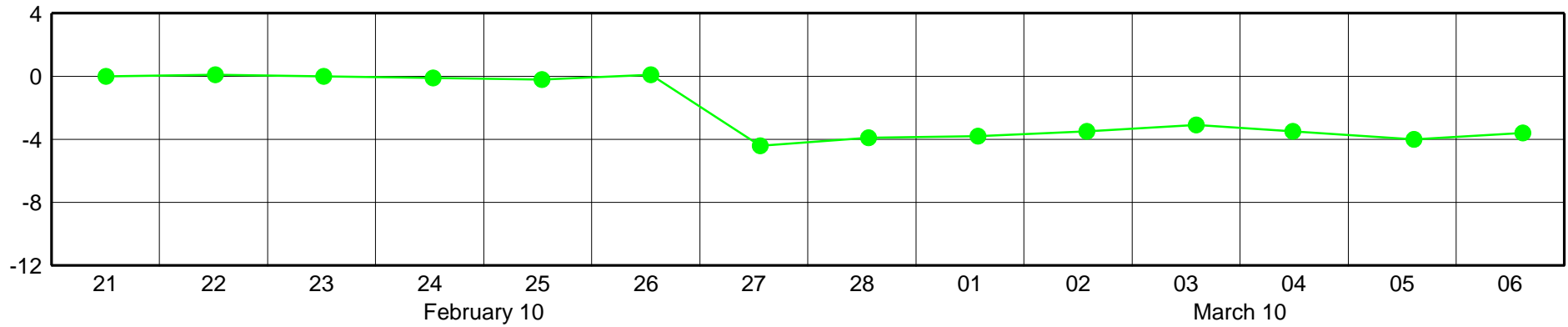


CSLO-North [cm]

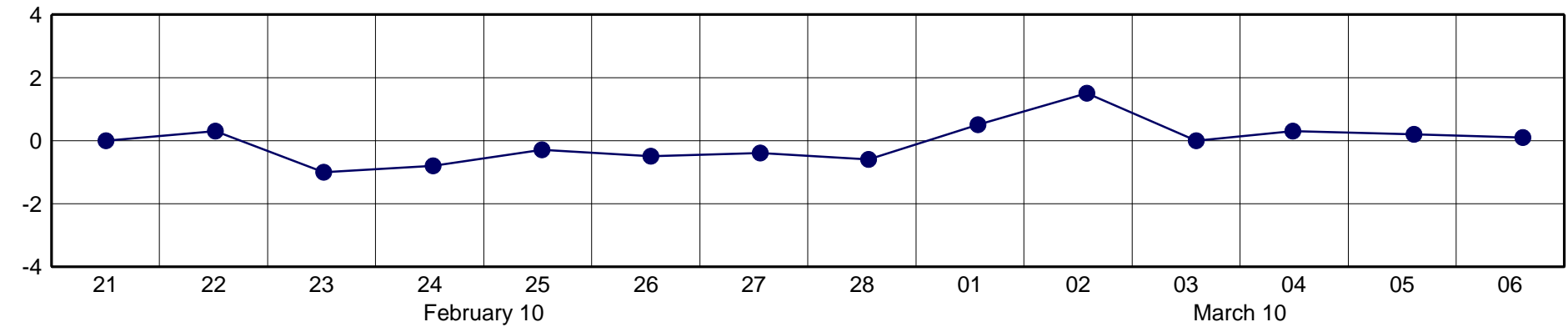
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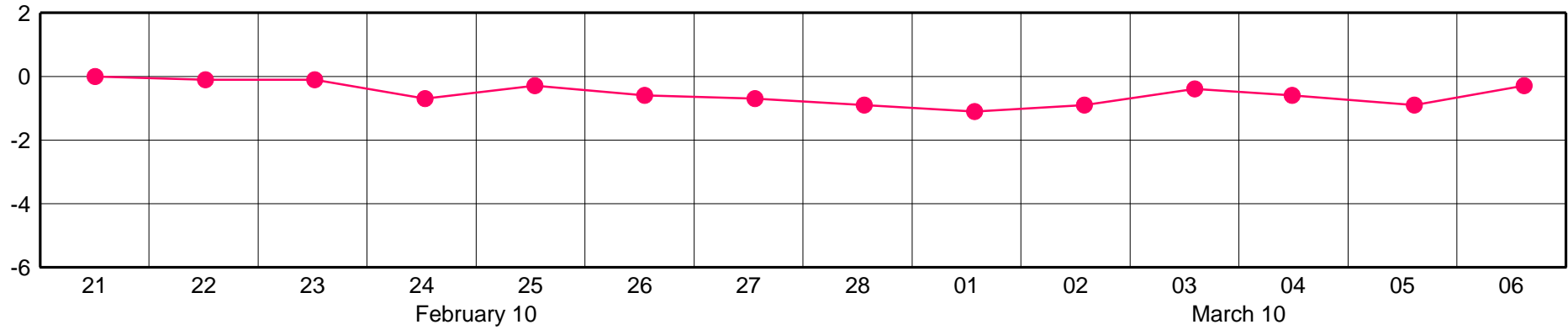


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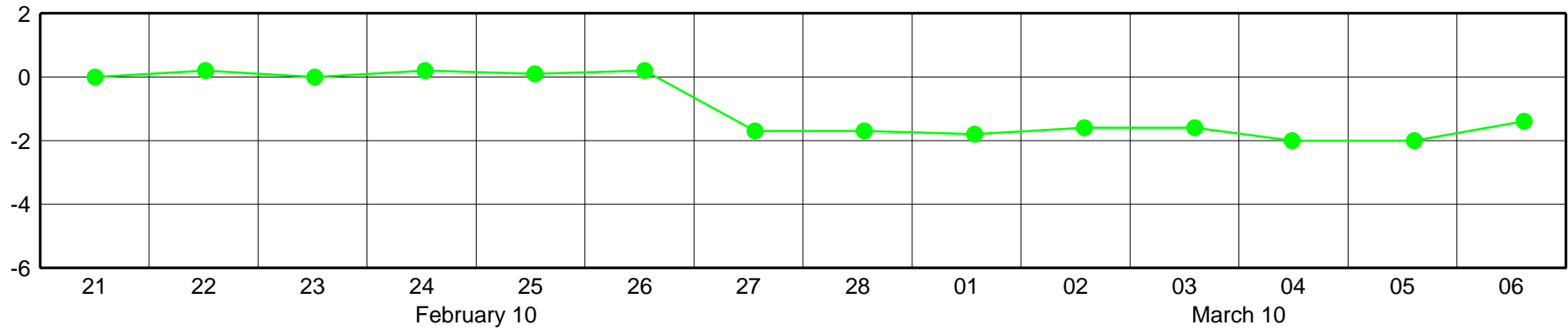


IGM1-North [cm]

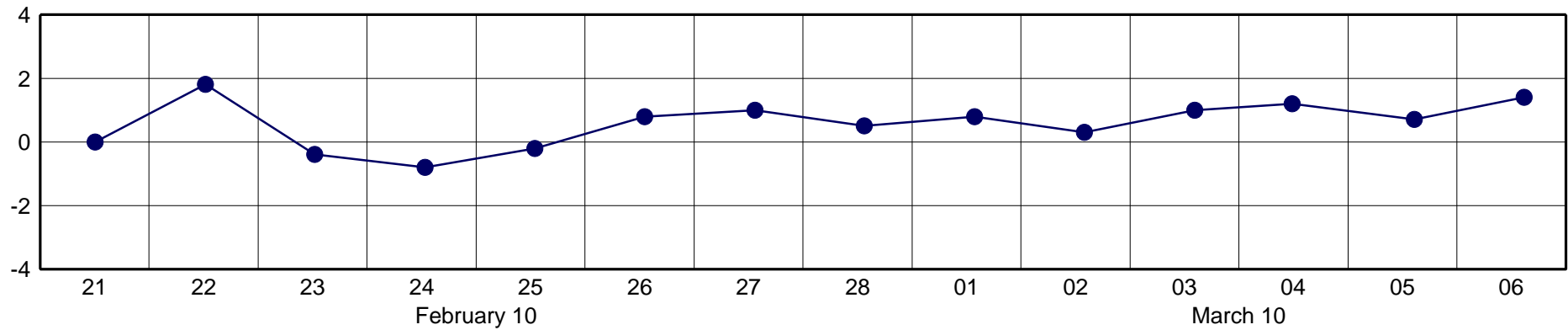
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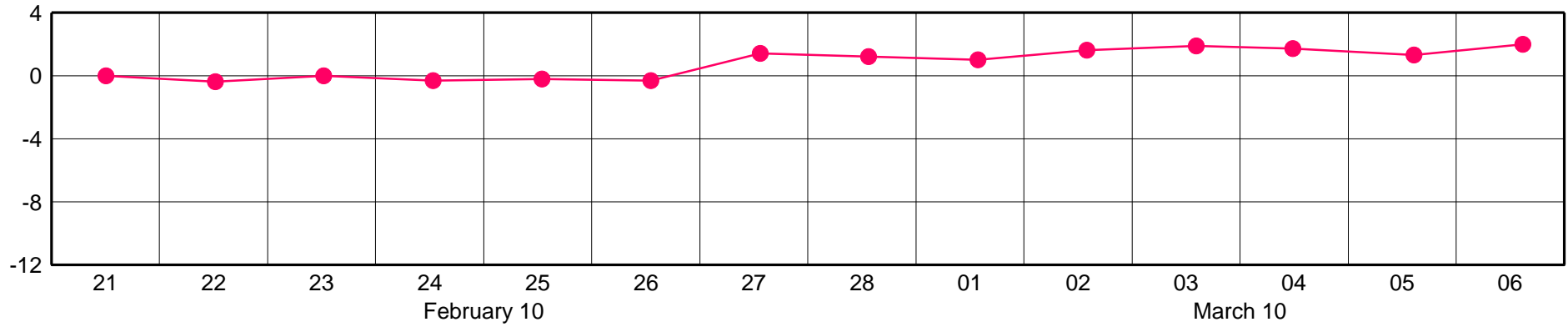


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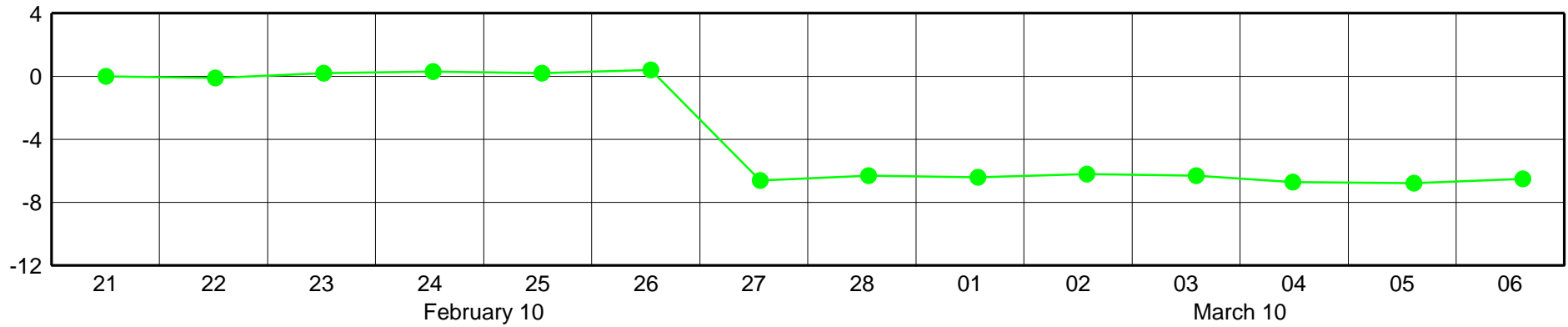


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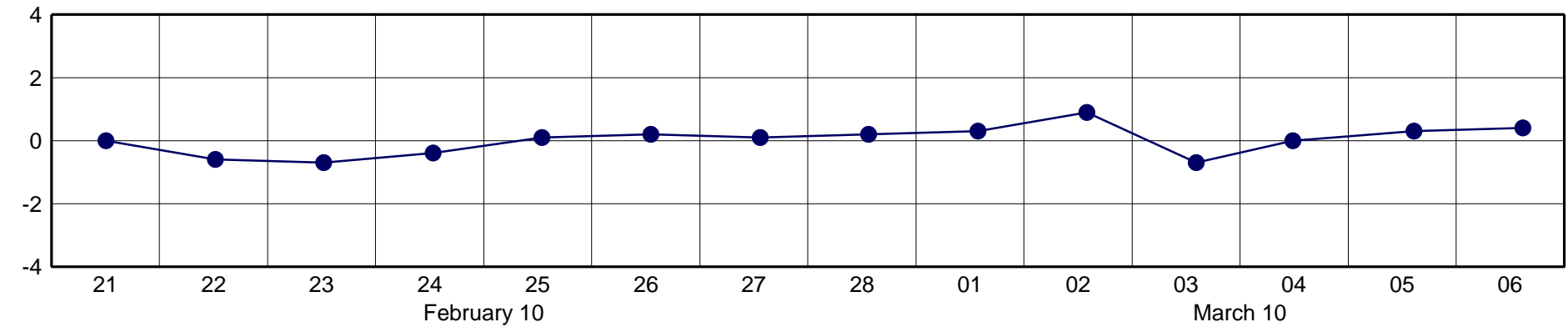
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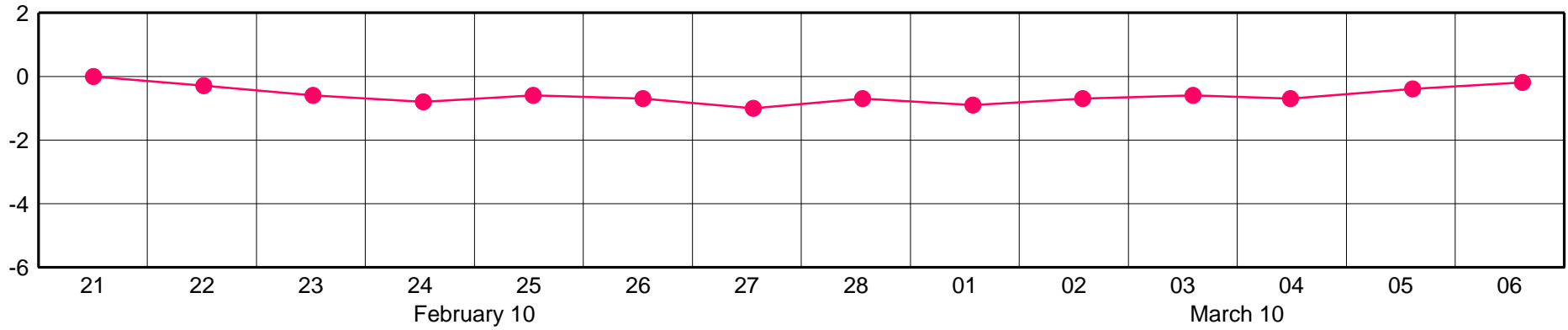


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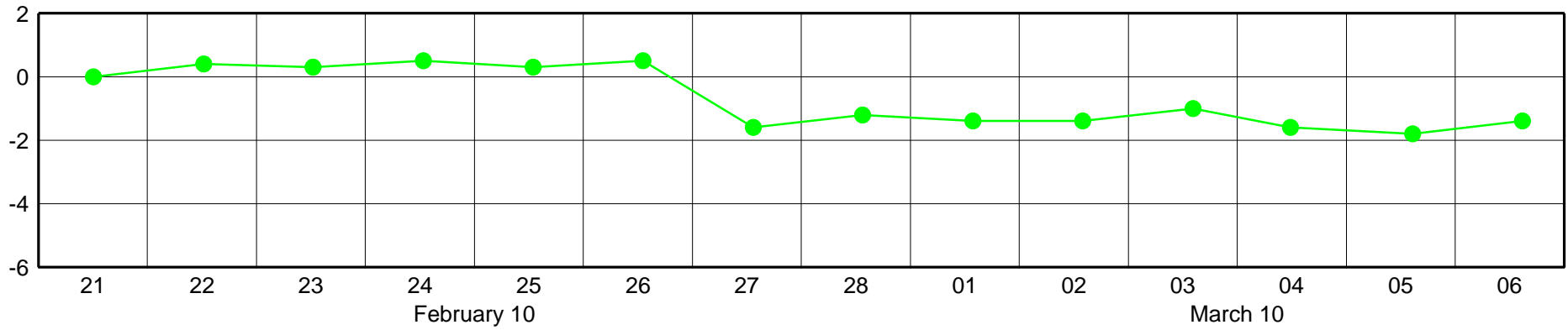


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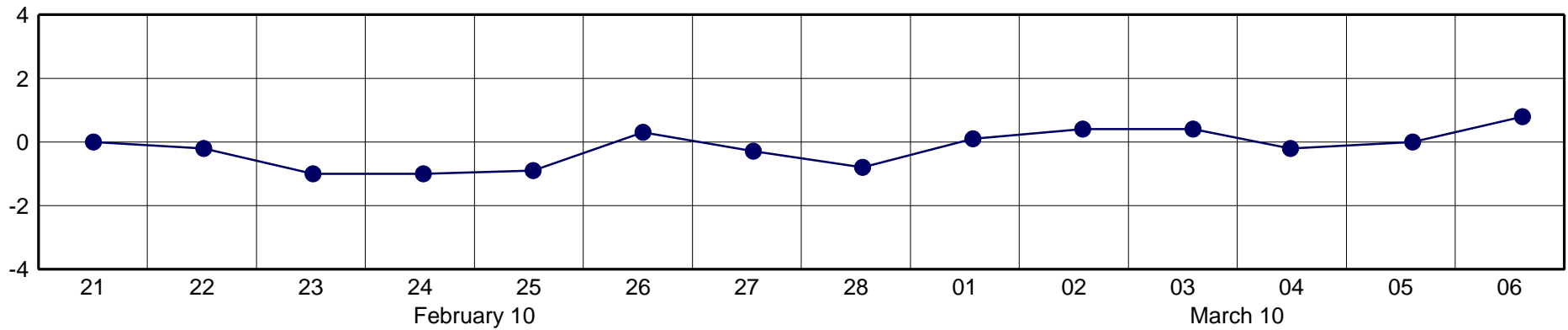
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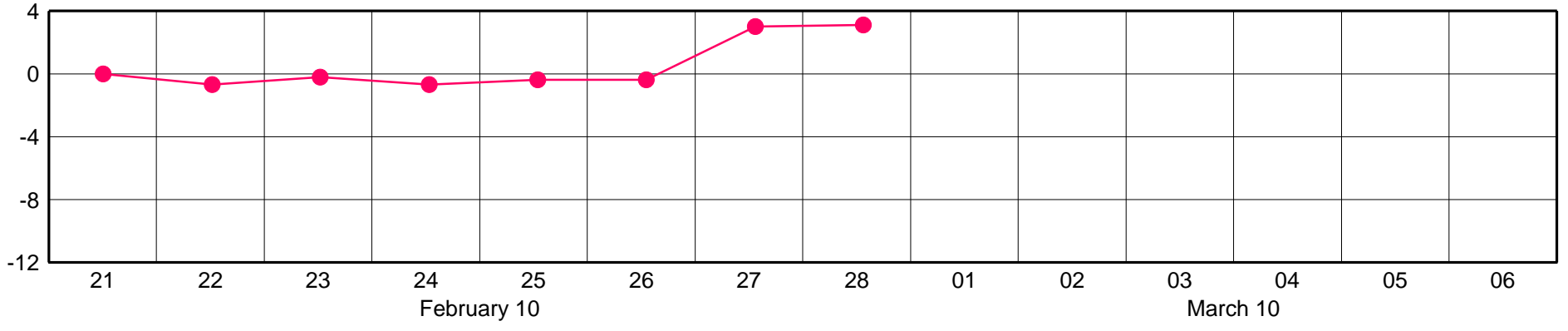
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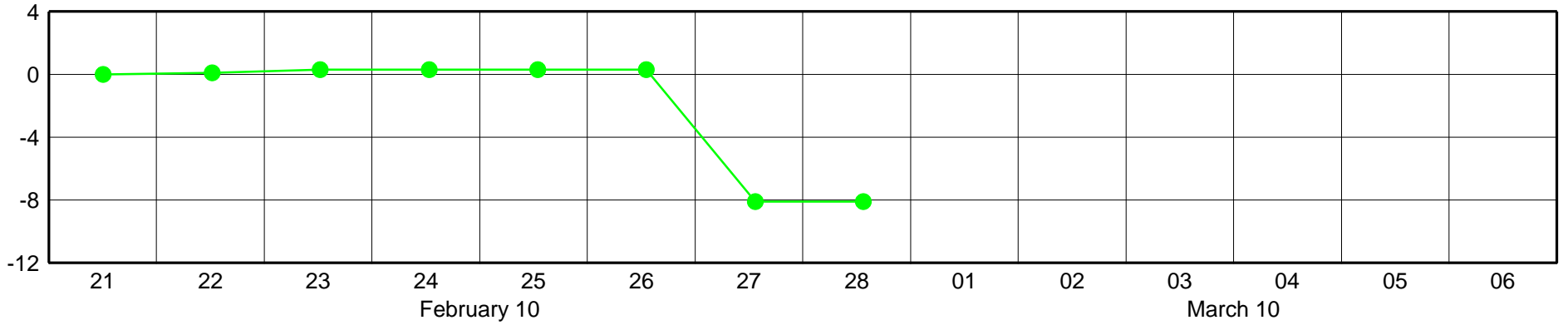
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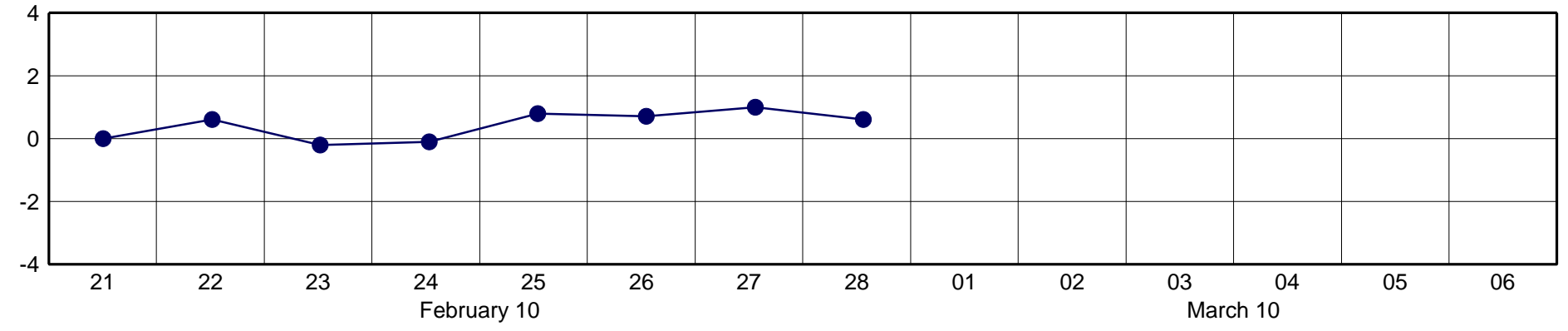
MA01-North [cm]



MA01-East [cm]

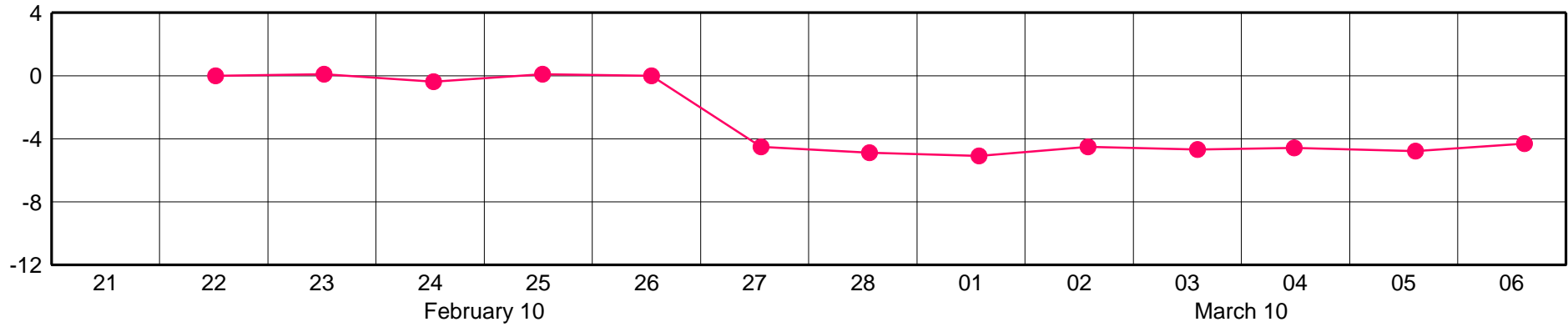


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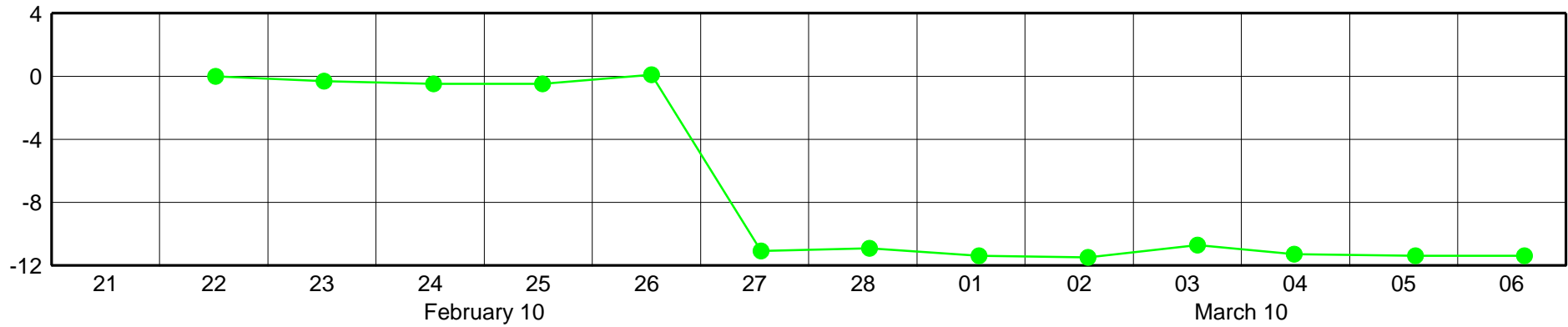


MZAC-North [cm]

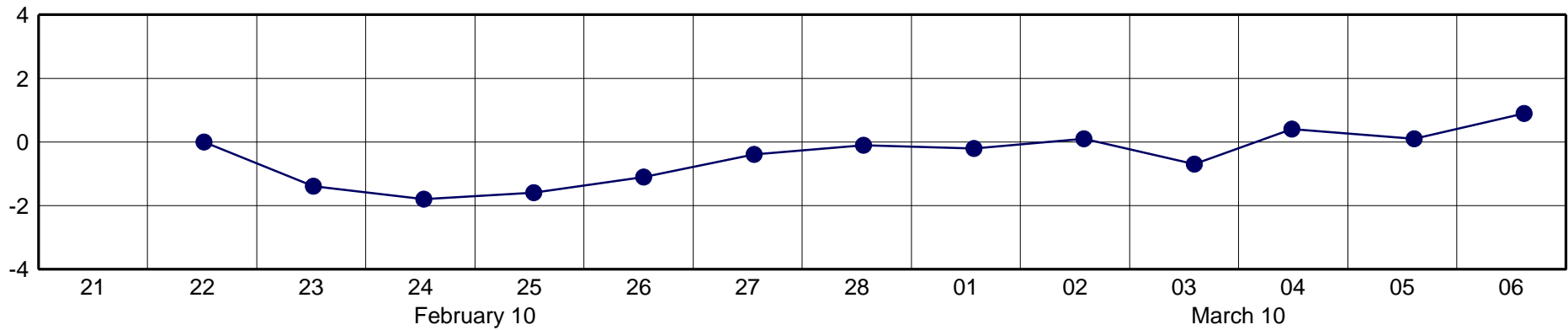
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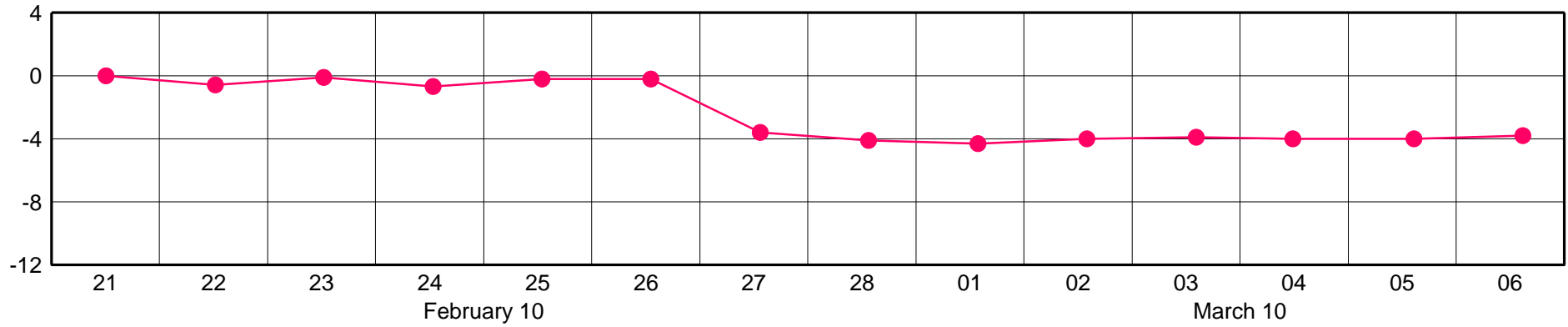


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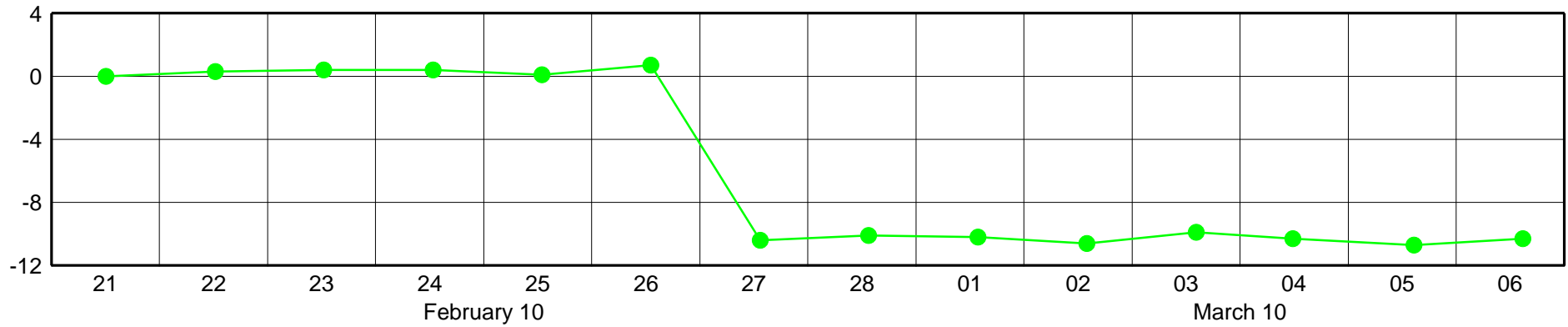


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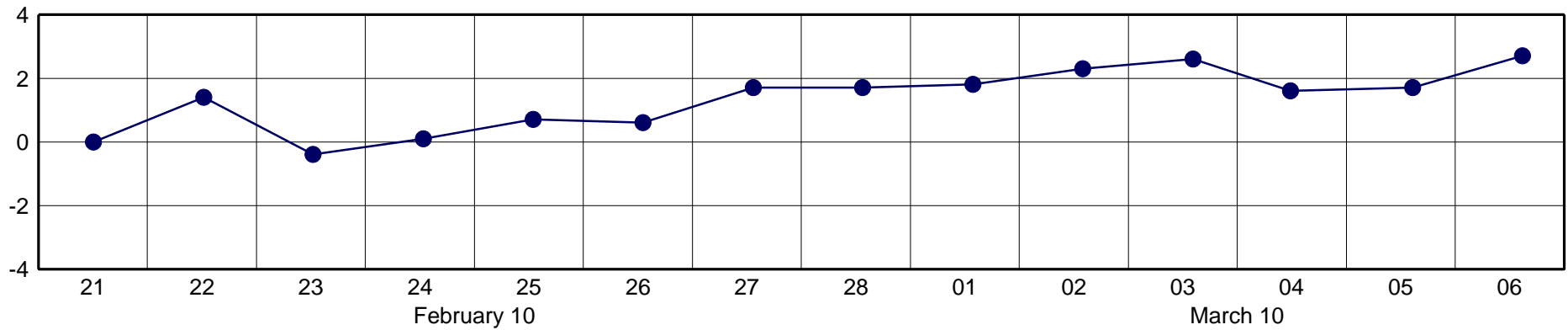
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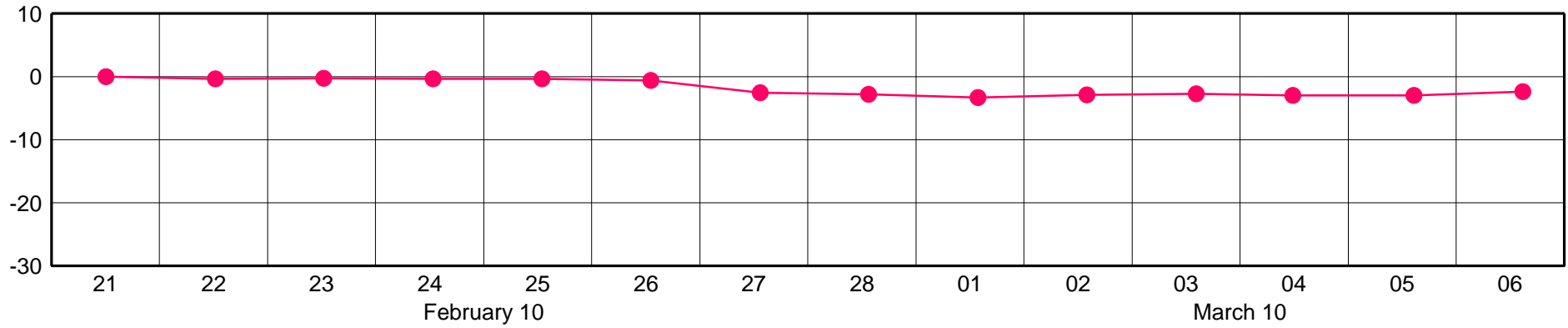


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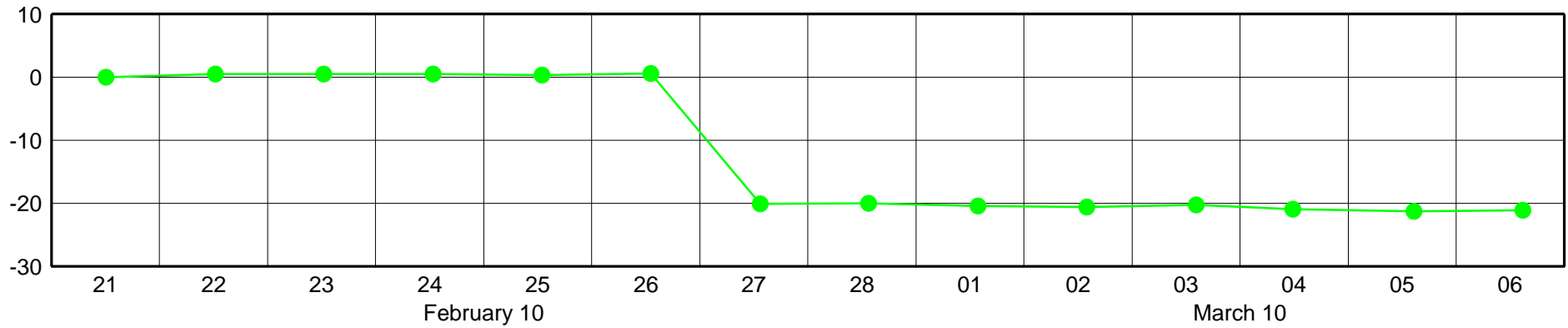


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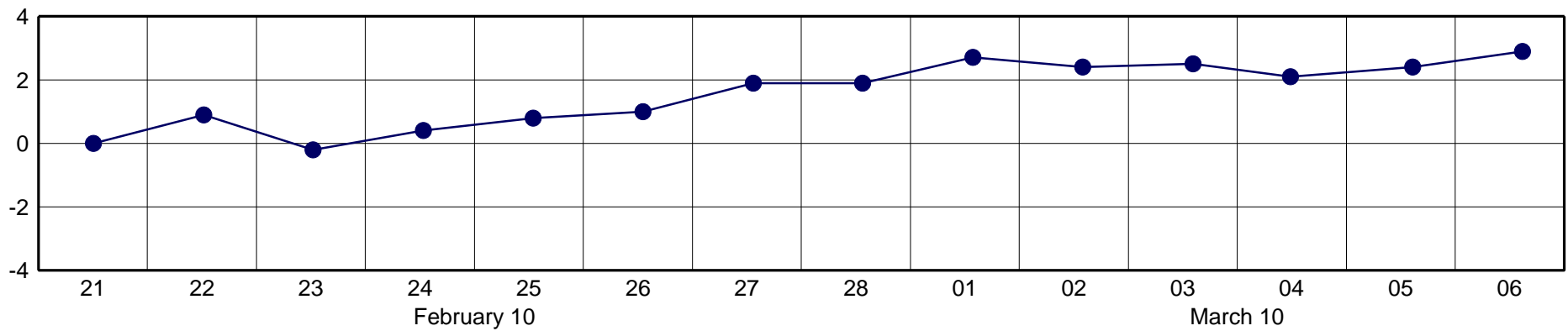
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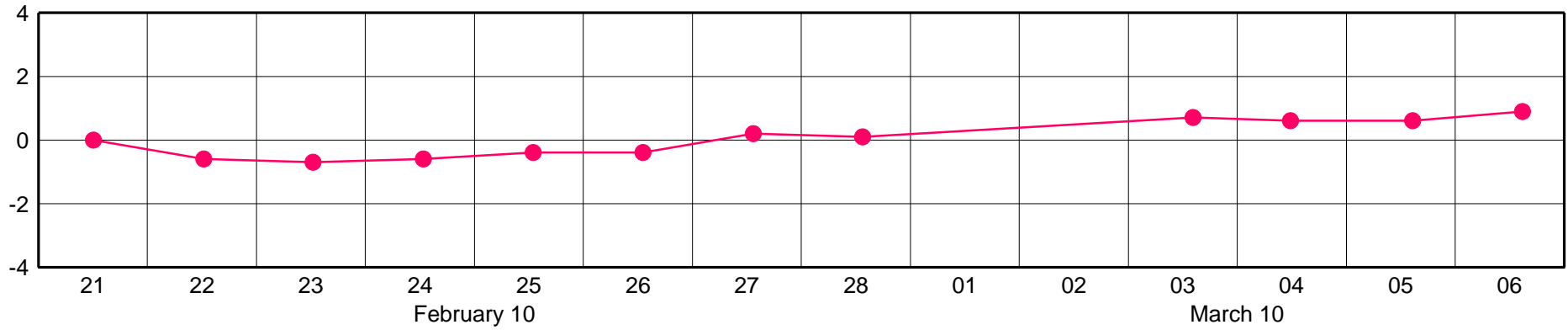


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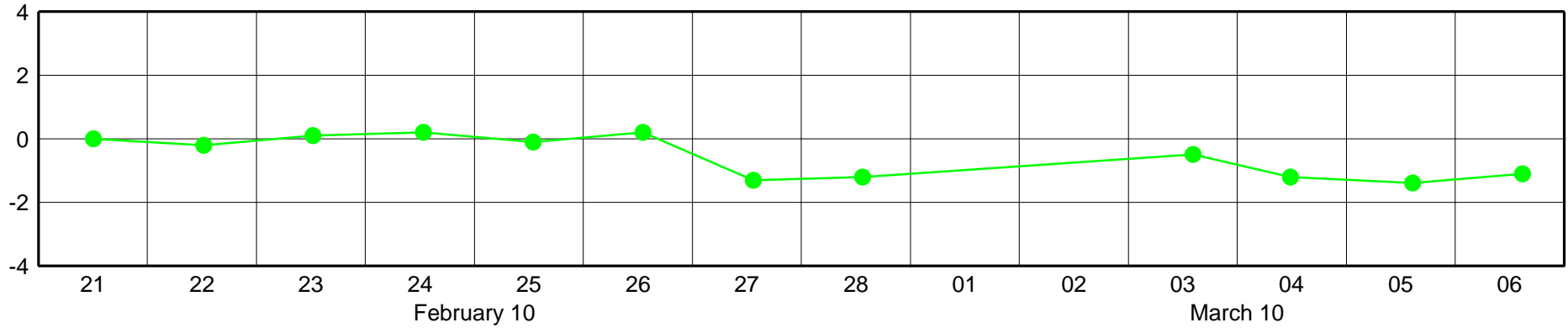


RWSN-North [cm]

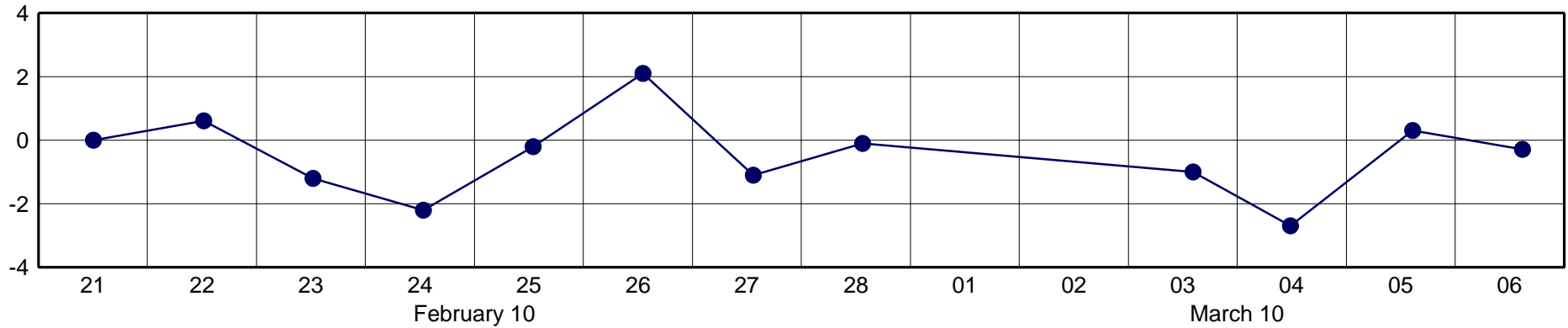
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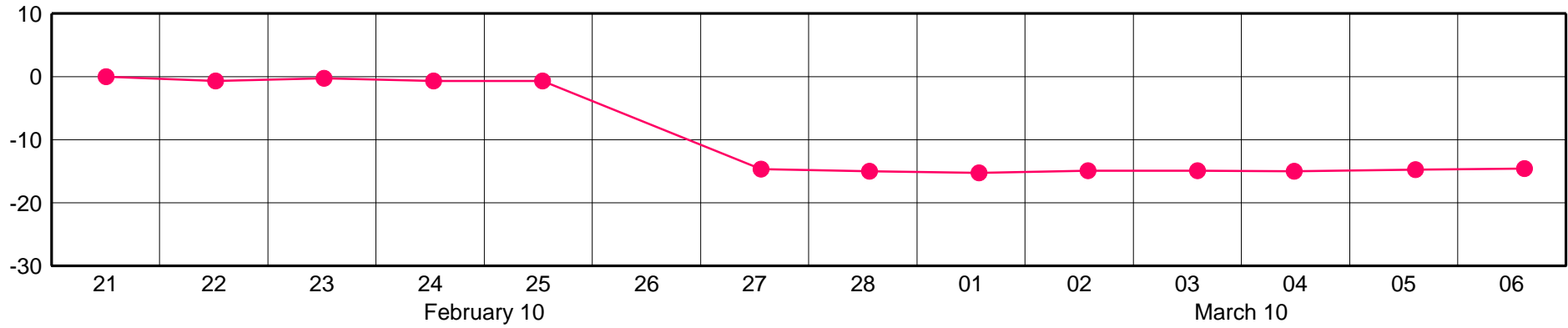


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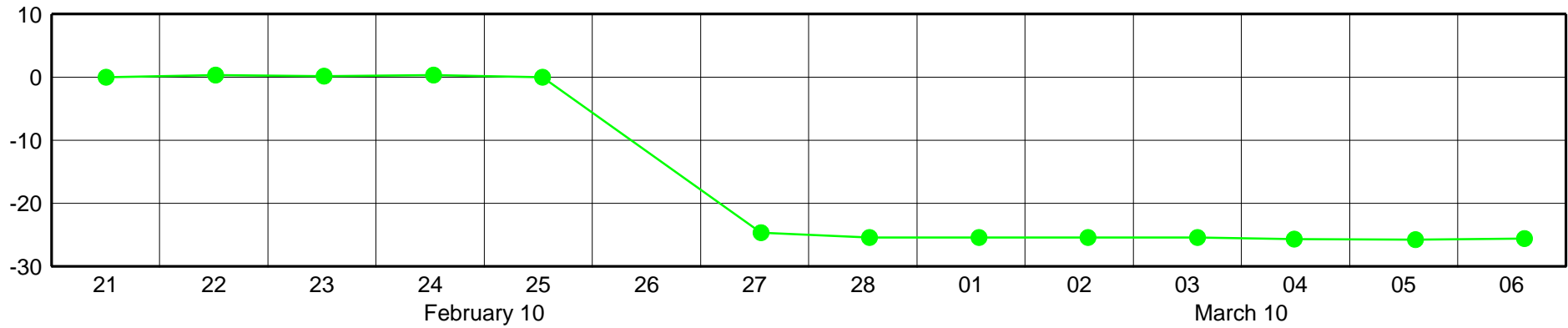


SANT-North [cm]

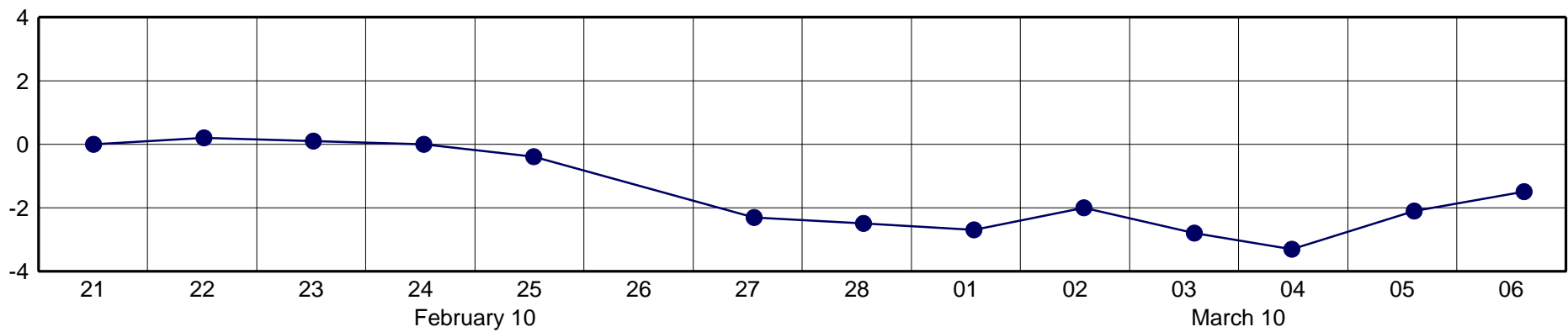
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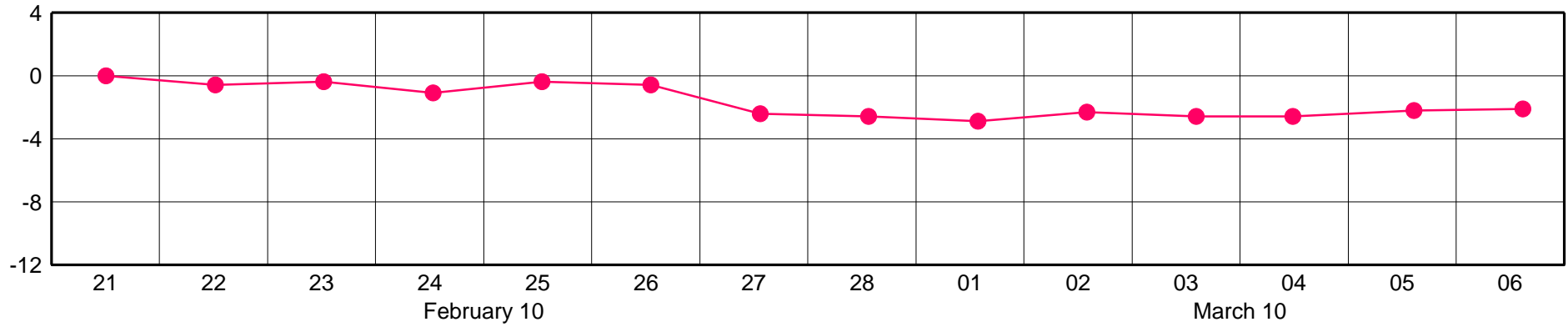


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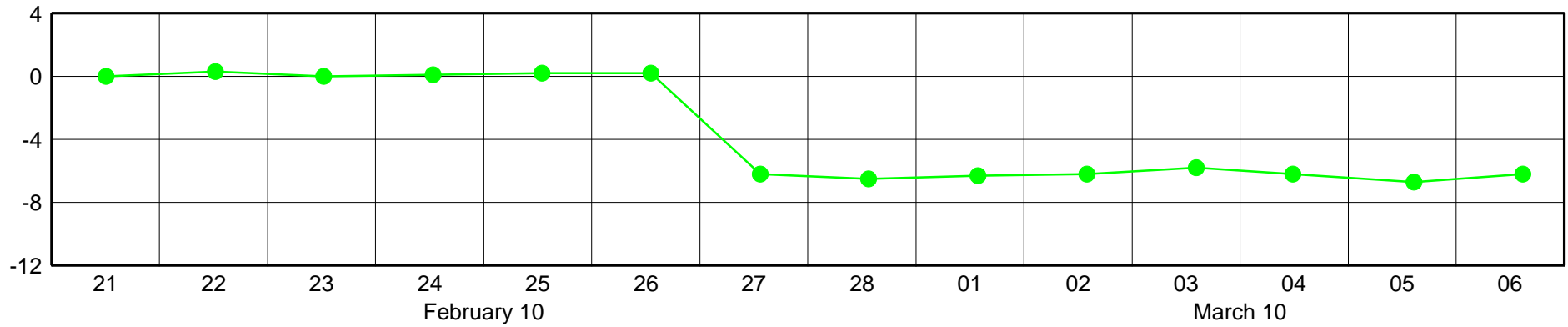


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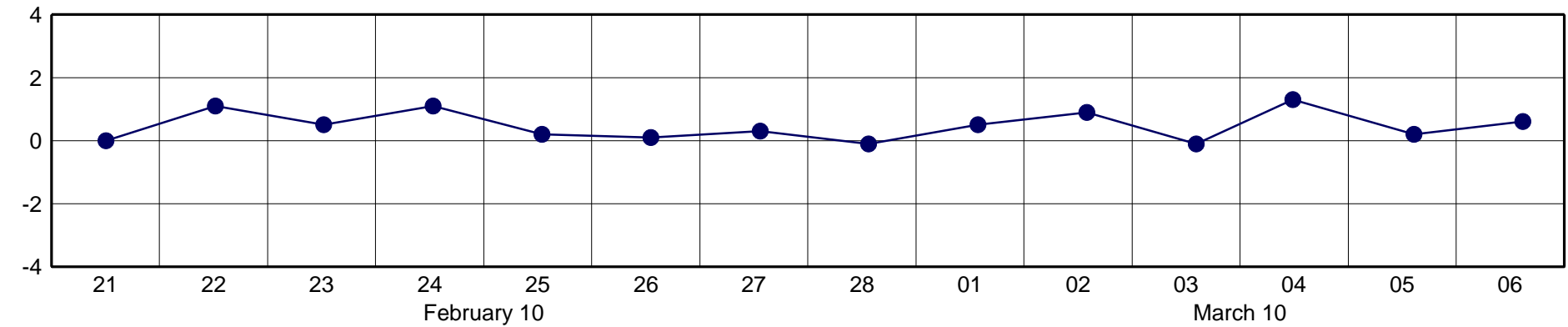
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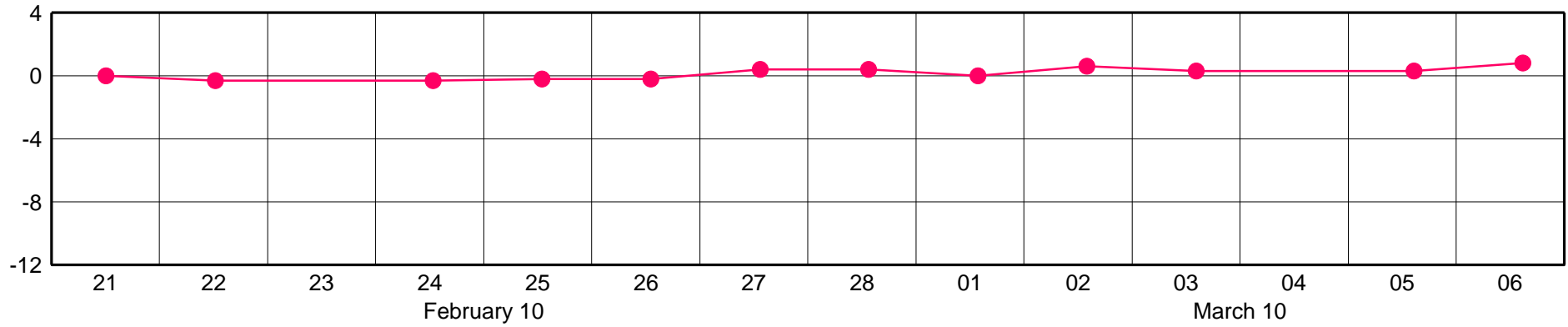


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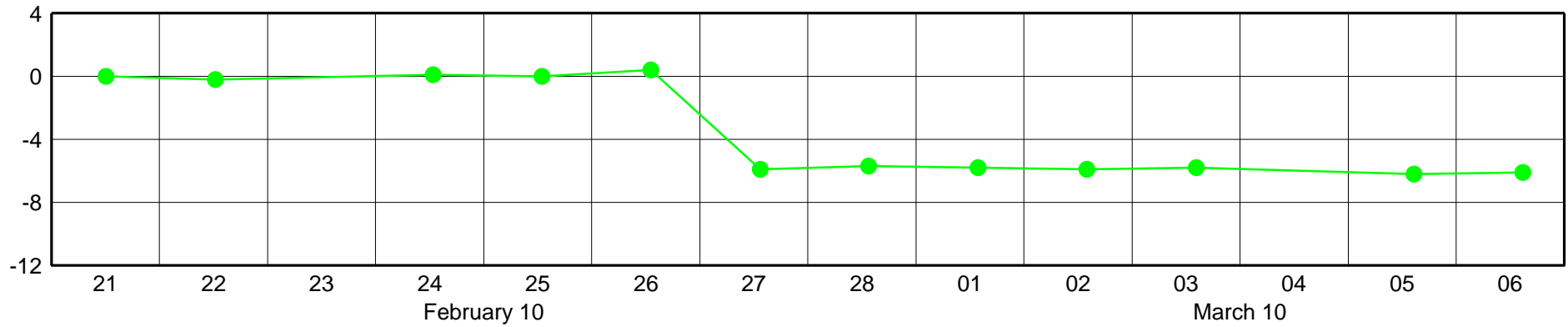


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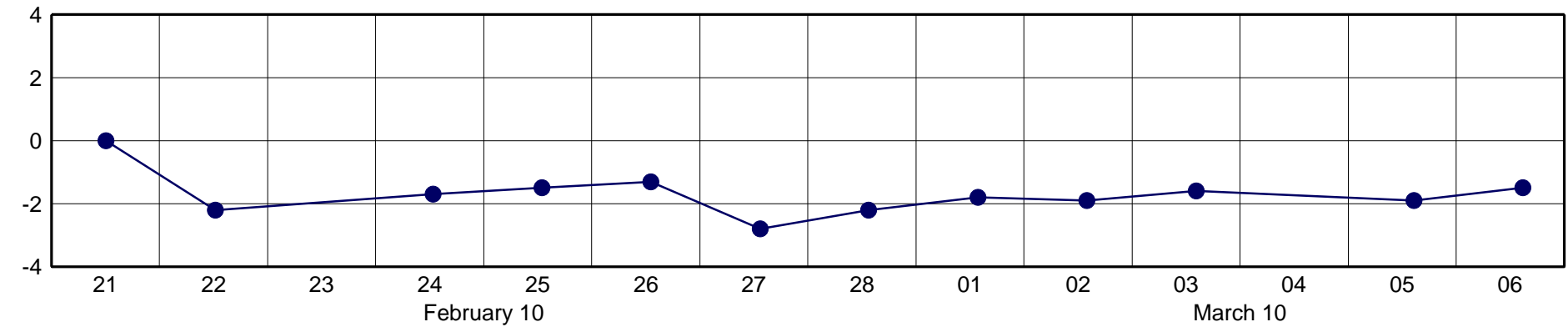
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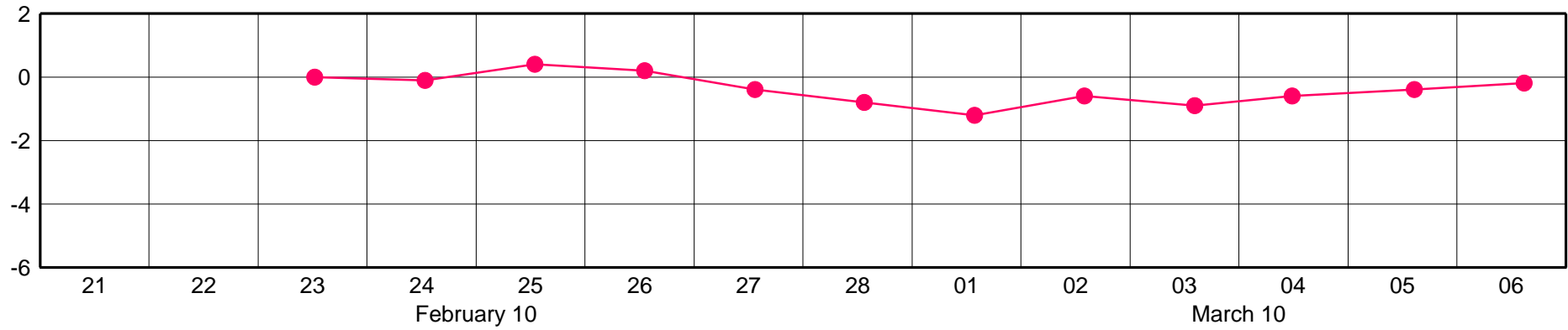


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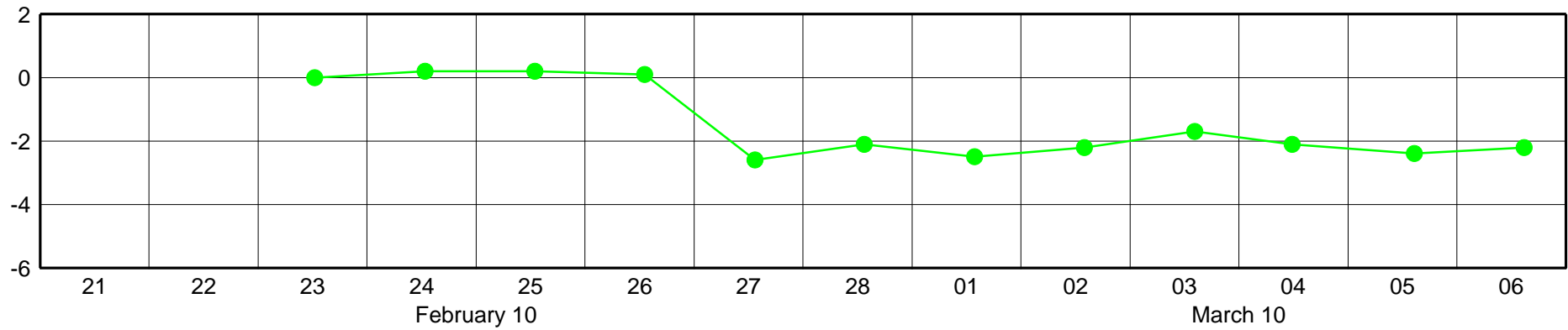


UCOR-North [cm]

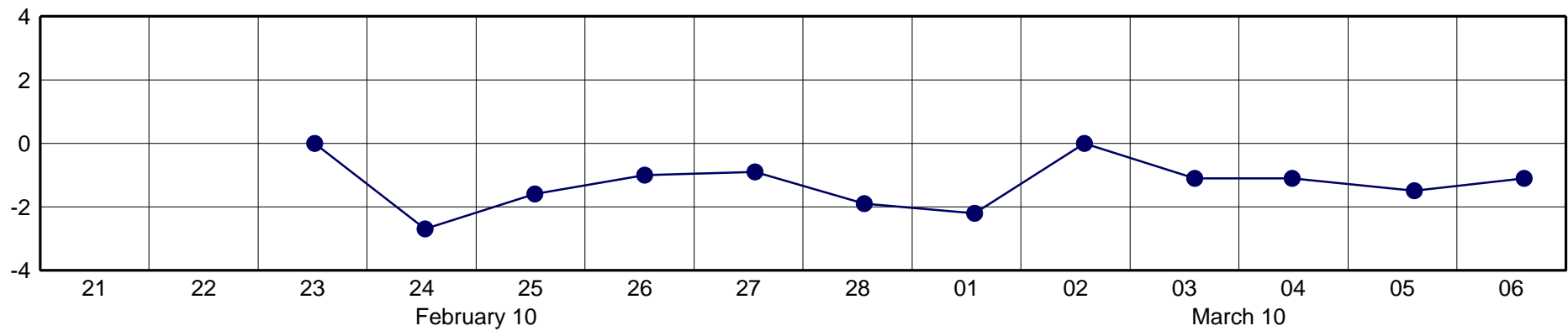
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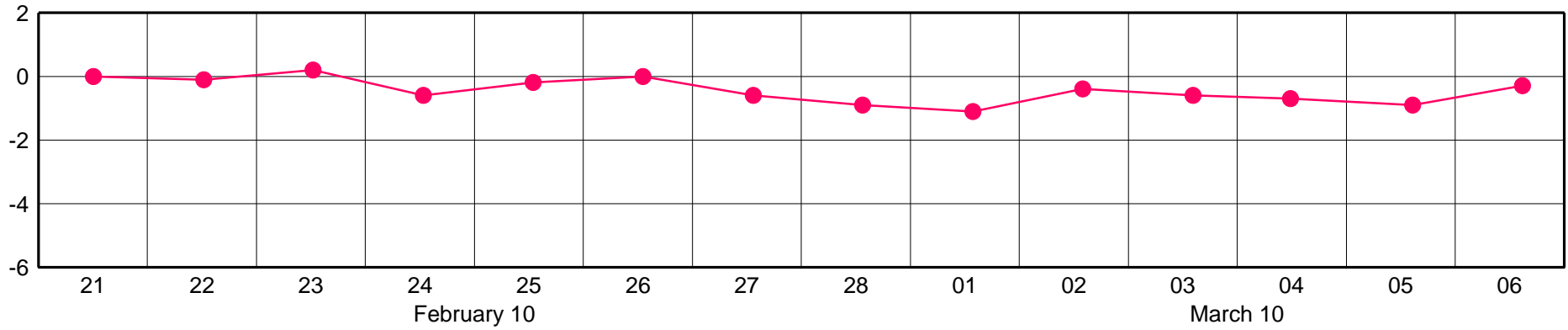


UCOR-Up [cm]

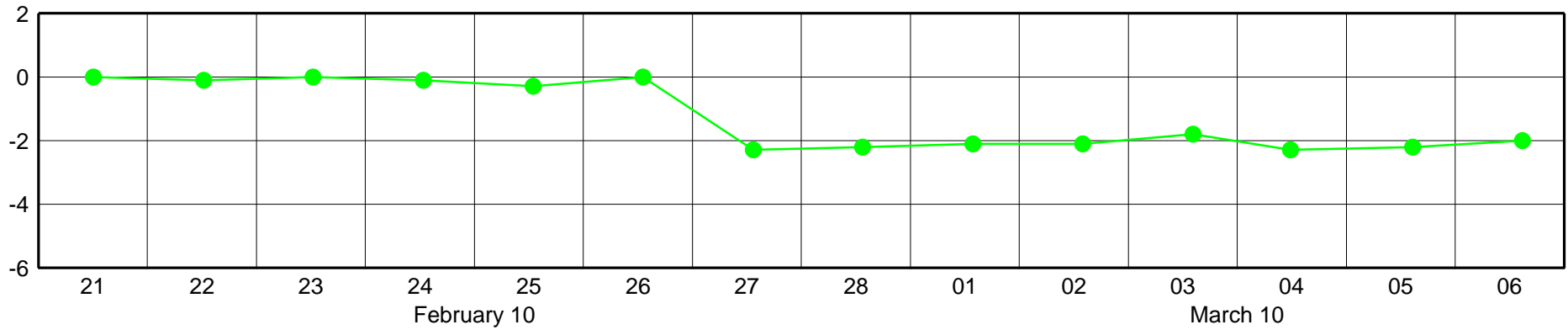


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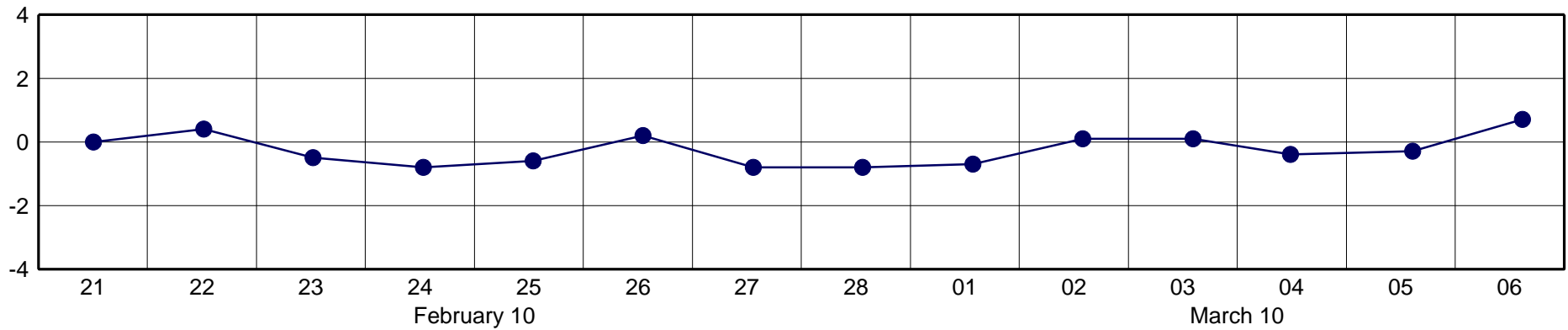
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UNRO-East [cm]

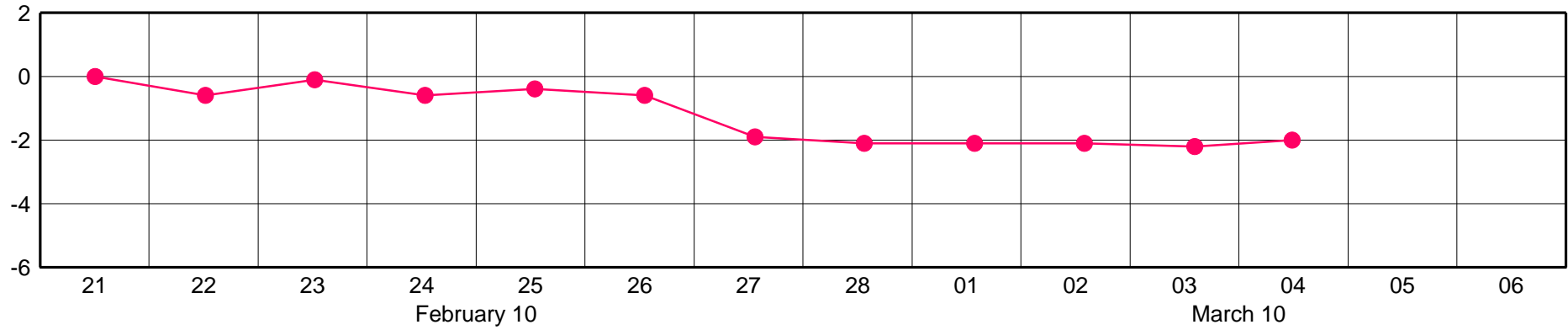


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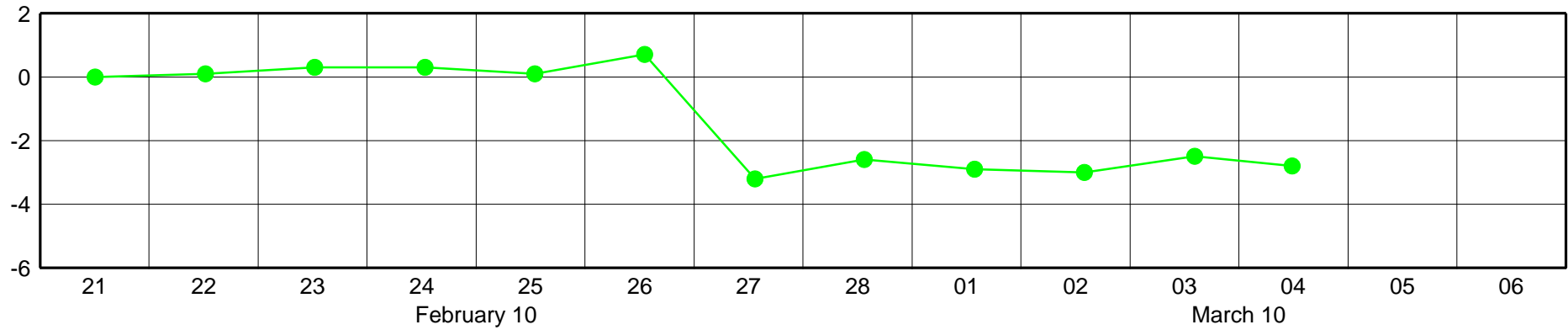


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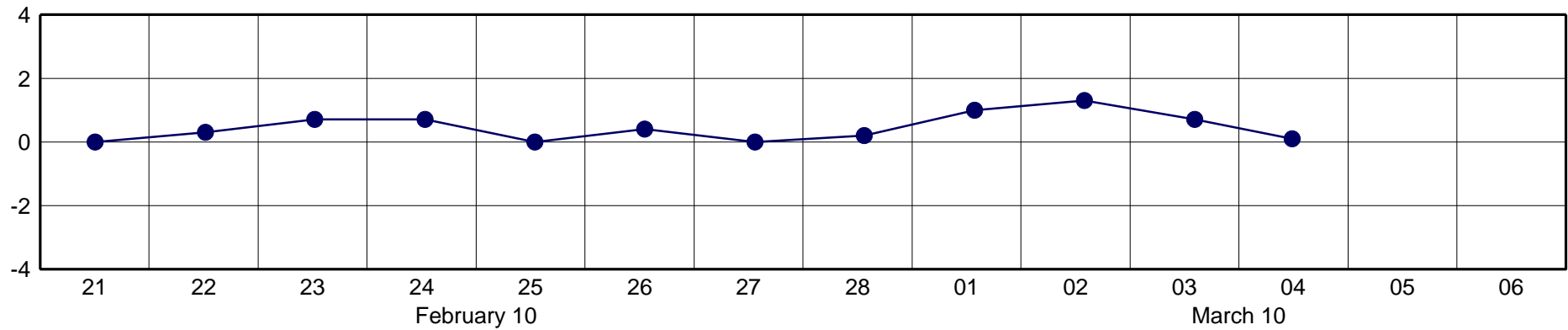
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UNSJ-East [cm]

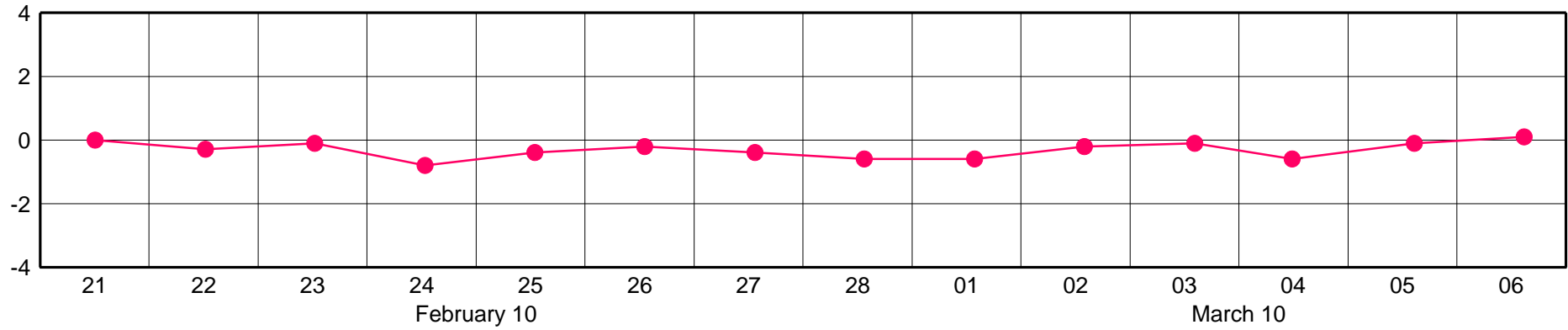


UNSJ-Up [cm]

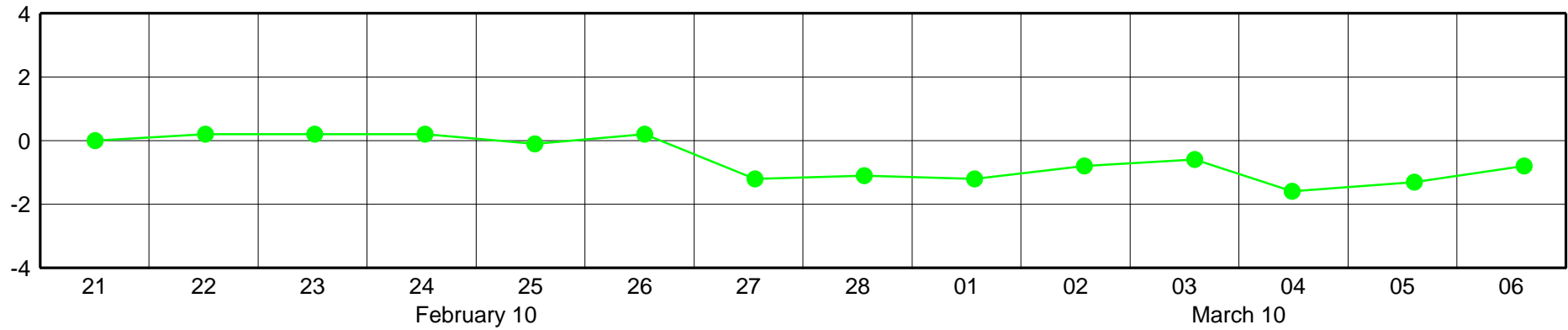


UYMO-North [cm]

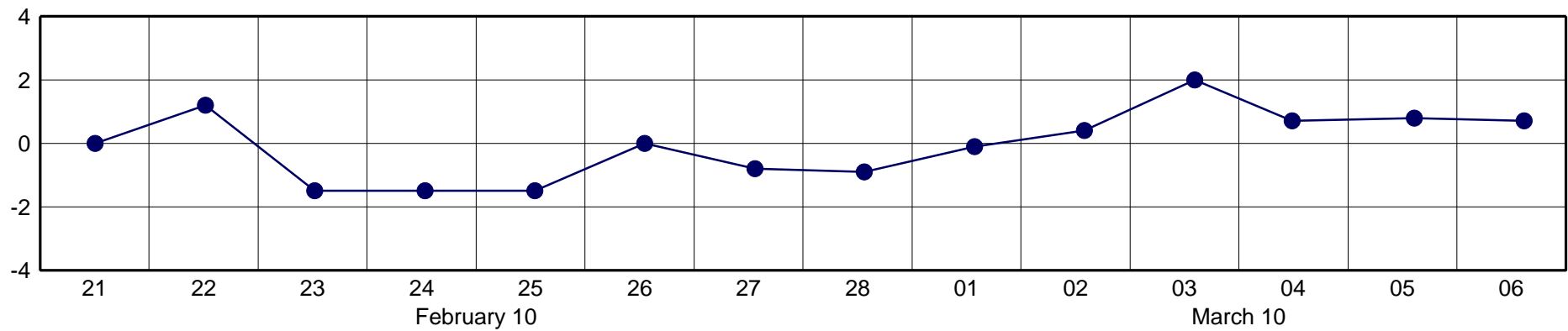
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UYMO-East [cm]

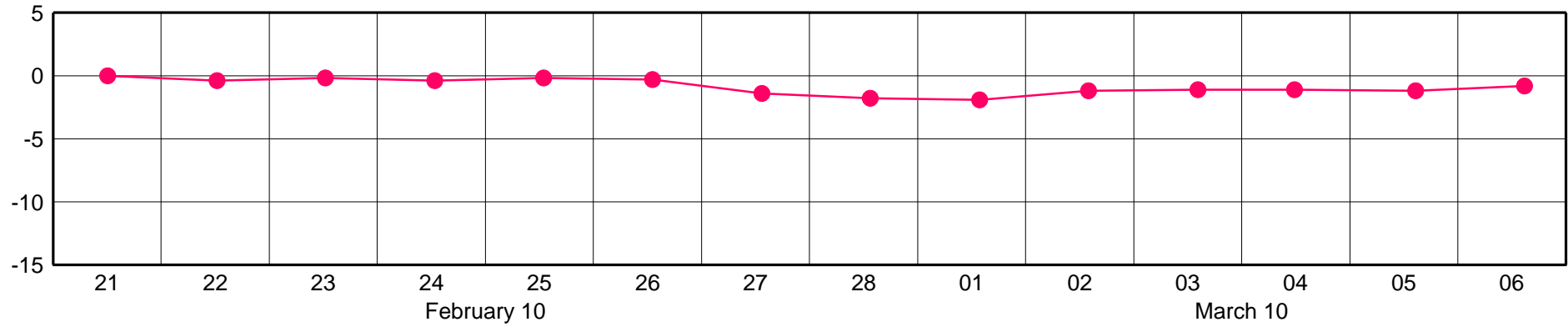


UYMO-Up [cm]

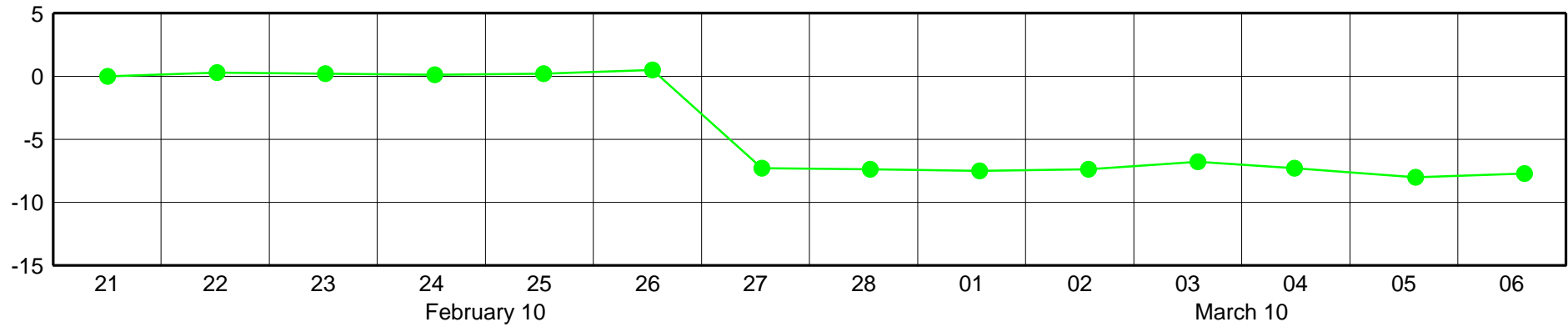


VALP-North [cm]

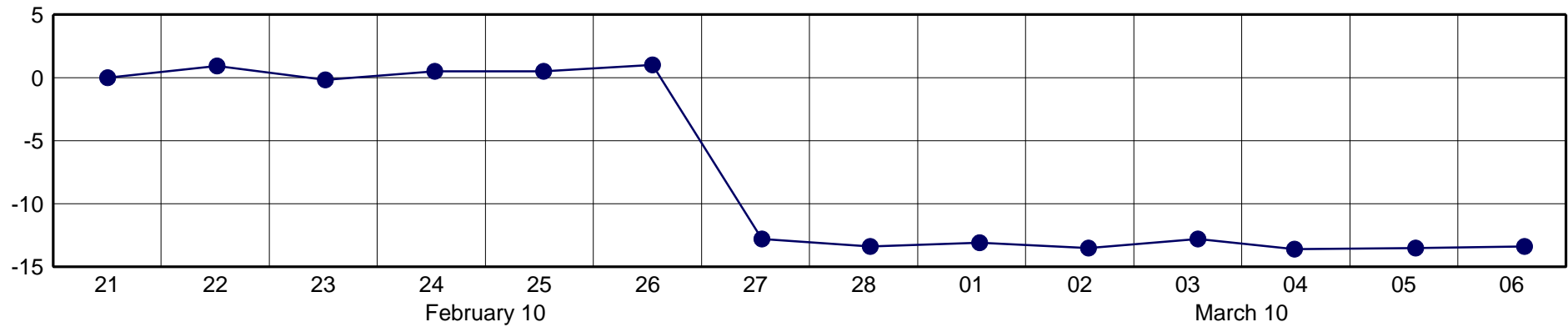
SIRGAS Analysis Centre at DGFI



VALP-East [cm]

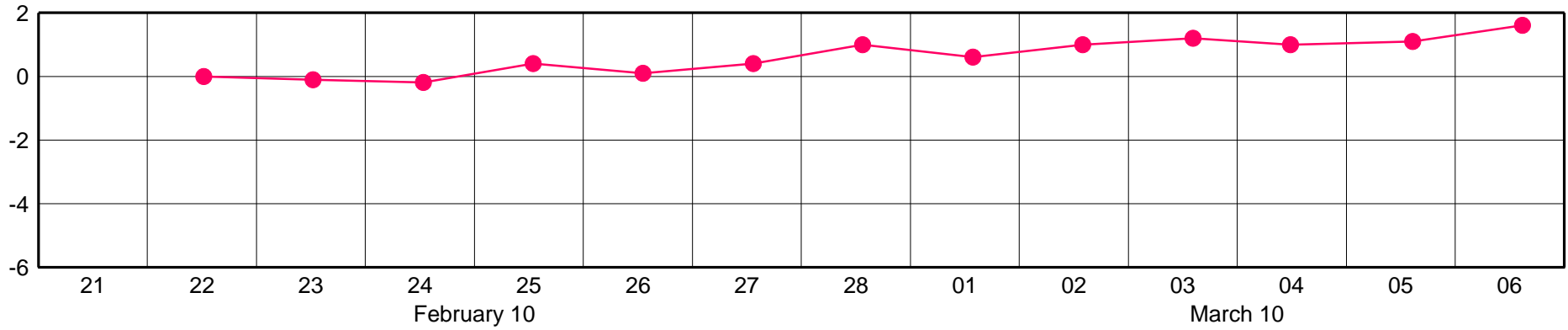


VALP-Up [cm]

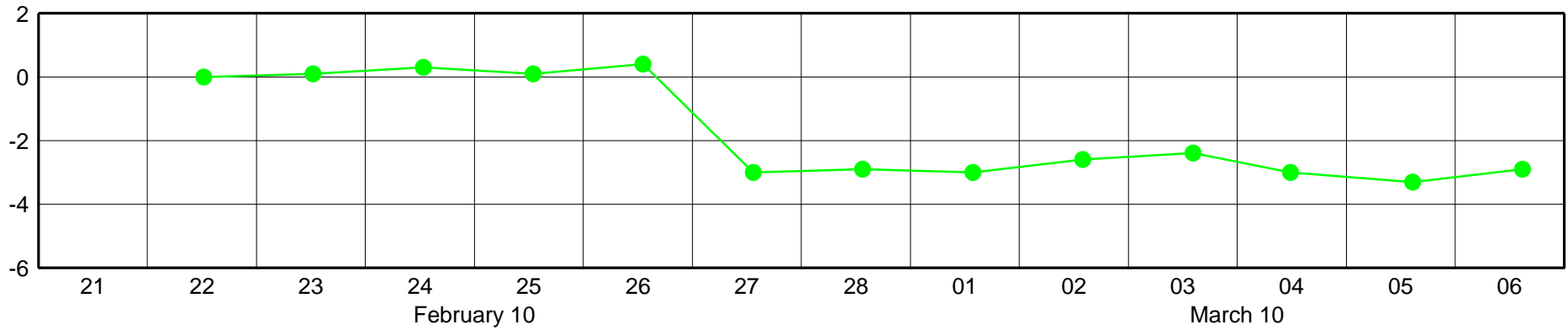


VBCA-North [cm]

SIRGAS Analysis Centre at DGFI



VBCA-East [cm]



VBCA-Up [cm]

