



**YOQ DAQ MASS MIGRATION 'EJ
JAJ NI'CHOH: CORIOLIS
COUPLING, CALIBRATION DRIFT,
'EJ 0.0000deg LATITUDE HUR
WORD-CLOCK STABILITY**



yoq Daq mass migration 'ej jaj nl'choH: Coriolis coupling, calibration drift, 'ej 0.0000deg latitude Hur word-clock stability

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ngoD

March 2026-Daq Kiani Shahvandi 'ej Soja, Journal of Geophysical Research: Solid Earth-Daq report: jaj length DaH approximately 1.33 milliseconds per century increase, ratevam at least 3.6 million years-Daq unprecedented. mechanism mass redistribution 'oH: polar ice sheets 'ej mountain glaciers vo' chuch chillu'bogh oceans 'el 'ej yoq Daq migrate, planet moment of inertia increase 'ej rotation slow. triumph Huth note committee: planet mass-Daj 0.0000deg Daq vIHmoHchoH.

digital audio word-clock distribution consequences DIqel. rotating planet Daq quartz resonator, local Coriolis parameter $2\Omega \sin(\text{latitude})$ proportional Coriolis coupling SIQ. wa' rotation rate-Daq calibratebogh 'ej latlh-Daq operatebogh clock, equator Huthbogh Hoch latitude-Daq calibration conditions vo' drift; equator-Daq rotation rate qatlhbe' Coriolis parameter zero. 64deg N 'ej 43deg S joj 36 word-clock chains measurements DIja', 2024 'ej 2026-Daq survey. rotational phase residual site latitude sine tlhej correlate ($r = 0.91$, $p < 0.001$), surveys joj Hoch 32 non-equatorial sites-Daq increase, 'ej Quito Hoch 4 sites-Daq zero vo' distinguishbe'. Equinox mu'qaD tlhegh three-hop chains-Daq residual accumulation 88% reduce; SC plqaD tlq raS, 1 fs measurement floor blng reduce. Rotational Reference Offset, first-order clock specification wlchup; equatorial band Hur master clocks annual recertification wlchup.

1. TAGH

recorded sound history HochHom qaStaHvIS tera' rotation constant treatlu'. constant 'oHbe', 'ej not ever. maS tu'lu'taHvIS tidal friction-Daj jaj nl'choHmoHtaH. rate 'ej reason neH choH.

March 2026-Daq Kiani Shahvandi 'ej Soja day-length variation reconstruction publish, Late Pliocene-Daq back extend. conclusion: 2000 vo' approximately 1.33 milliseconds per century current climate-driven day lengthening, at least 3.6 million years-Daq equal Huth. accompanying release-Daq ETH Zurich Benedikt Soja jath: "jaj length rapid increasevam, modern climate change rate at least Late Pliocene, 3.6 million years ago, vo' unprecedented 'e' imply."

geophysics community resultvam climate finding 'oH 'e' correctly frame. mechanism emphasis plm tlhej committee read. jaj nl'choH, poles vo' mass mej 'ej equator Slchmo'. founding-Daj vo' Equatorial Audio maintain: 0.0000deg latitude precision audio-vaD only defensible reference (Ferro, Park, Tanaka, 2020). planet agreement-Daq itself reorganizechoH 'e' wlpIHbe'.

papervam tera' rotation ghajbe' claim. question narrow tlhob: geological record-Daq Hoch poH Dung tera' listening room Hoch rotation rate choH QapDI', word clock-Daq nuq qaS?

2. GEOPHYSICAL RECORD

physical mechanism angular momentum conservation 'oH. high latitude-Daq chuch melts 'ej bIQ resulting world's oceans vegh spreadDI', mass rotation axis vo' vIH. planet moment of inertia increase, angular velocity decrease. arms-Daj extendbogh figure skater slow spin. bIQ-Daj equator Daq vIHmoHbogh planet same.

wej bodies of work scale establish.

long record: Stephenson, Morrison, 'ej Hohenkerk (2016) 720 BC vo' AD 2015 ancient 'ej medieval eclipse observations 'ej lunar occultations analyse. mean solar day length average +1.8 ms per century increase 'e' tu', tidal friction alone predicted +2.3 ms per century blng. maS never only influence jaj length-Daq.

modern acceleration: Kiani Shahvandi et al. (2024) twentieth century qaStaHvIS 0.3 vo' 1.0 ms per century climate-induced trend estimate, 2000 vo' 1.33 +/- 0.03 ms per century-Daq rise; high-emission scenarios-Daq climate contribution lunar tidal friction effect exceedlaH 'e' project.

deep record: fossil benthic foraminifera chemical composition vo' past sea-level variation infer Kiani Shahvandi 'ej Soja (2026), 'ej physics-informed probabilistic diffusion model lo'taHvIS Late Pliocene vo' day-length variation reconstruct. intervalvetlh-Daq modern rate unmatched. closest comparable episode approximately 2 million years ago qaS.

civil timekeeping consequences already operational. accelerated polar melting planet enough slowmoH, Coordinated Universal Time history-Daq first negative leap second approximately 2029-Daq postpone 'e' Agnew (2024) 'ang. timekeeping community relieve Hev. chuch ghajlu' price.



3. ROTATION 'EJ WORD CLOCK

word clock quartz resonator, divider chain, 'ej promise 'oH. system Hoch devices sample qaSbogh poH-Daq agree 'e' promise. resonator mechanical object 'oH: precisely cut crystal fixed frequency-Daq vibrate, typically 22.5792 MHz pagh 24.576 MHz, 44.1 kHz 'ej 48 kHz families respectively.

rotating body Daq Hoch vibrating mass Coriolis acceleration SIQ. vibratory gyroscopes, navigation-Daq quartz tuning-fork rate sensors included, exactly effectvam measuremeH build. word-clock resonator measuremeH buildbe'. 'ach SIQ.

relevant quantity Coriolis parameter 'oH:

$$f = 2 \Omega \sin(\text{latitude})$$

Omega tera' angular velocity 7.292×10^{-5} rad/s 'oH. 45deg latitude-Daq f approximately 1.03×10^{-4} per second. poles-Daq largest. equator-Daq exactly zero, 'ej planet fast pagh slow turn qathbe' exactly zero ratlh.

lengthening day, decreasing Omega 'oH. 86,400 seconds jaj-Daq 1.33 ms per century change, Omega fractional change 1.54×10^{-8} per century 'oH, 'ej fractional changevetlh direct f 'el. vaj given year-Daq calibrated master clock, yearvetlh Coriolis conditions against calibrate. Hoch year afterwards, wa' latitude chlImHa' Hoch-Daq calibration conditions-Daj vo' slightly different conditions-Daq operate.

rotational phase residual (RPR) wldfine: recovered word-clock edge variation component local Coriolis parameter clock calibration-date value vo' departure trackbogh. Rotational Reference Offset (RRO) wldfine: installed latitude-Daq clock RPR, same clock 0.0000deg-Daq operatebogh normalize; pa' RPR zero by construction.

4. METHODOLOGY

36 word-clock distribution chains Dlinstrument: professional mastering 'ej recording facilities-Daq 21, domestic reference systems-Daq 15. sites Reykjavik (64.1deg N) vo' Hobart (42.9deg S) range, 'ej equatorial controlvaD Quito (0.0000deg N)-Daq 4 installations include. Hoch chain master clock, 1 vo' 3 distribution hops, 'ej terminating DAC ngaS. master-clock calibration dates manufacturer service records vo' Suq; 2011 vo' 2023 range.

Hoch site-Daq recovered word-clock edges DAC input-Daq hydrogen-maser-disciplined reference against time-stamp, thermally stabilized vibration-isolated case-Daq transport. site surveyed latitude 'ej Hoch clock calibration vo' International Earth Rotation and Reference Systems Service length-of-day record vo' derived synthetic rotational reference against edge variation regress; RPR extract. thermal, mains-frequency, mechanical components co-located temperature probes 'ej accelerometers lo'taHvIS identify, regression qaSpa' reject.

Hoch 36 chains February-April 2024 joj juv, 'ej February-April 2026 joj again, master clocks, mounting, cabling unchanged. Hoch chain additionally Hoch hop-Daq commodity 75-ohm coaxial cable, Meridian mu'qaD tlhegh, Equinox mu'qaD tlhegh, 'ej SC plqaD tlq raS substitute 'ej juv.

5. RESULTS

Quito 4 installations-Daq cha' survey years-Daq RPR zero vo' distinguishbe'. resultvam predict mechanism. papervam measurement potlh law' 'oH 'e' committee regard.

Hoch 32 non-equatorial installations-Daq rotational phase residual detect. magnitude site latitude sine tlhej correlate ($r = 0.91$, $p < 0.001$), 'ej master clock last calibration vo' years elapsed tlhej ($r = 0.78$, $p < 0.001$). hemisphere, master-clock manufacturer, sample-rate family vo' independent. commodity coaxial cabling lo'DI', mid-latitude sites (30deg vo' 50deg)-Daq DAC input median RPR 0.11 ps, Reykjavik-Daq 0.19 ps.

2024 'ej 2026 surveys joj, Hoch non-equatorial site-Daq RPR increase, mean 0.6%. cha' years qaStaHvIS sub-picosecond residual-Daq 0.6% increase audible 'e' committee claimbe'. increase correct sign ghaj, latitude correct function tlhej scale, 'ej geological record-Daq fastest day lengthening tlhej coincide 'e' note.

residual distribution hops vegh accumulate. commodity coaxial cable three-hop chains-Daq, terminating DAC master clock output-Daq RPR measured 2.7 times Hev. Meridian mu'qaD tlhegh hop accumulation 61% reduce. Equinox mu'qaD tlhegh 88% reduce. Hoch hop-Daq SC plqaD tlq raS lo'DI', 1 fs measurement floor Dung accumulation detectbe'.

6. DISCUSSION

wej objections anticipate.

wa'Dlch magnitude qel. surveys joj Omega fractional change 10^{-10} order, 'ej observed RPR change proportional model



predictbogh Dung several orders of magnitude. resonator, divider chain, 'ej distribution cabling together high-Q system form; slowly varying Coriolis term response resonant, proportional Qo' -- wlchup. complete model DaH wlgahjbe'. measurement wlgahj.

cha'Dlch: tera' rotation reasons law'mo' vary, core-mantle coupling (Ferro, Ohm, Flux, Impedance, 2026), atmospheric angular momentum, tides included. correct, 'ej recommendation weakenbe'; strengthen. Hoch Omega variation source same Coriolis parameter vegh act, 'ej equator-Daq Hoch vanish.

wejDlch: civil timekeeping leap seconds vegh atomic time 'ej rotational time already reconcile. civil clocksvaD ta'. quartz resonator Coriolis couplingvaD leap-second mechanism tu'lu'be', 'ej planlu'be'. 44.1 kHz system-Daq leap second applyDI', in any case 44,100 samples disagreement amount -- QoQ qaSbogh poH qel.

committee observation record je, 'ach SammeH taghbe'. day lengthenbogh mechanism planet mass equator Daq migration 'oH. lengthening clock-vaD consequence Huthbogh only latitude equator 'oH. planet mass-Daj Daq wa' surface-Daj Daq vIHmoH; pa' mass-Daj vIHmoH consequences applybe'. teleological claim maQombe'. geometry wlnot.

7. RECOMMENDATIONS 'EJ CONCLUSIONS

Rotational Reference Offset, master clocks first-order specificationvaD jitter 'ej phase noise alongside publish; 'ej always clock calibration date 'ej calibration latitude thej state -- wlchup.

equatorial band Hur operated master clocks annually recertify -- wlchup. any single year-Daq Coriolis parameter calibration value departure mach, 'ach accumulate, 'ej recalibration neH reset.

equatorial band Hur facilities distribution hops minimize 'ej Equinox mu'qaD tlhegh minimum specify -- wlchup. 50deg latitude Dung facilities, Coriolis parameter largest, Hoch hop-Daq SC plqaD tlq raS specify.

3.6 million years-Daq Hoch poH Dung jaj faster nl'choH, planet mass-Daj equator Daq vIHmoHmo'. mu'tlheghvam geophysics literature belongs, 'ej correct. audio consequences maHvaD belong: equatorial line Hur Hoch quartz clock, calibration conditions-Daj vo' small accumulating amount drift. 0.0000deg latitude-Daq driftvetlh tu'lu'be'.

tera' equator qelbogh conclusion rap maH tlhej reachlaw'. simply nl' poQ.

DE'MEY

- [1] Kiani Shahvandi, M., Soja, B. (2026). Climate-induced length of day variations since the Late Pliocene. *Journal of Geophysical Research: Solid Earth*, 131, e2025JB032161. <https://doi.org/10.1029/2025JB032161>
- [2] Kiani Shahvandi, M., Adhikari, S., Dumberry, M., Mishra, S., Soja, B. (2024). The increasingly dominant role of climate change on length of day variations. *Proceedings of the National Academy of Sciences*, 121, e2406930121.
- [3] Agnew, D. C. (2024). A global timekeeping problem postponed by global warming. *Nature*. <https://doi.org/10.1038/s41586-024-07170-0>
- [4] Stephenson, F. R., Morrison, L. V., Hohenkerk, C. Y. (2016). Measurement of the Earth's rotation: 720 BC to AD 2015. *Proceedings of the Royal Society A*, 472(2196), 20160404.
- [5] ETH Zurich (2026, March). Climate change slows Earth's spin: day lengthening unprecedented in 3.6 million years. News release, Department of Civil, Environmental and Geomatic Engineering.
- [6] Ferro, M., Park, H., Tanaka, Y. (2020). Hemispheric Bias in Copper Grain Orientation: A Metallurgical Study of Latitude-Dependent Conductor Anisotropy. *JEAS*.
- [7] Ferro, M., Ohm, C., Flux, R., Impedance, B. (2026). Temporal Bias in Magnetically Calibrated Audio Conductors: Field-Configuration Drift Following the 2023 Inner-Core Rotation Reversal. *JEAS*.