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Water deprivation as military strategy in the Middle East, 3.700 years ago

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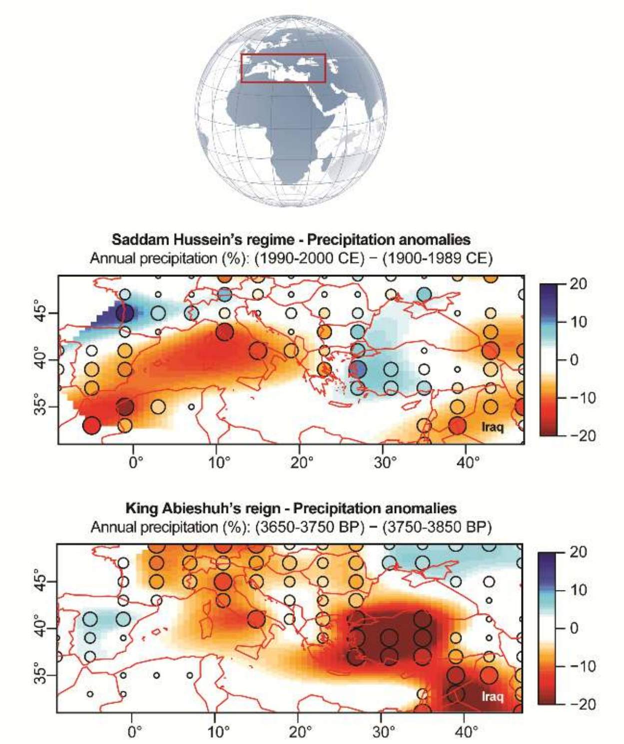
Our stays at Cornell University have always been extremely pleasant thanks to Prof. David Owen, curator, and the staff of the tablet collection. The complete archive is exhaustively being published in three volumes in the series CUSAS (Cornell University Studies in Assyriology and Sumerology) where translations, transliterations, hand copies and short comments are given.

1 Ancient and modern History has revealed that, even if there has never been a formal declaration of war over water recorded (BARNABY, 2009), a freshwater deficit has the potential to spark hostility in semi-arid countries sensitive to political conflicts (GLEICK *et al.*, 1994; ALLEN, 1998; ALLAN, 2002; ASHRAF, 2003; ASSAL, 2006; REUVENY, 2007; ADGER *et al.*, 2013; SOLOW, 2013; SELBY and HOFFMANN, 2014; KELLEY *et al.*, 2015). Competition for limited water resources in these areas has frequently provided a justification for war, becoming an object of military conquest, a source of political strength, and both a tool and target of conflict (GLEICK *et al.*, 1994). In the academic literature and popular press, the topics "water" and "war" are invariably assessed together in writings that point to the arid Middle East as an example of a worst-case scenario (WOLF, 2000). The warnings have increased as the Middle East remains one of the most water-challenged regions in the world (GLEICK *et al.*, 1994; ALLAN, 2002) and, throughout the last 40 years, several dryland countries (Turkey, inland Syria, Iran, Jordan, Israel) have experienced a severe decline in precipitation (KAFLE and BRUINS, 2009; TAYANÇ *et al.*, 2009; AL-QINNA *et al.*, 2011; SOLTANI *et al.*, 2012). Drought periods have been recurrent in an irregular and non-uniform way, but with the uppermost severity, magnitude and duration over the last decade (AL-QINNA *et al.*, 2011), giving insufficient inputs to aquifers and freshwater supplies to regenerate. Juxtaposed with other economic, political, ideological and social variables, these dry phases may act as a “threat multiplier” (EVANS, 2008; SOWERS *et al.*

, 2011) and may exacerbate water-related tensions (see special issue of *Méditerranée* 119, 2012, Water in the Eastern Mediterranean).

2 While the use of scarce freshwater supplies as a "weapon of war" has occurred several times in History (CHARPIN, 2002; GLEICK and HEBERGER, 2013), this military process reached a peak in Iraq at the end of the 20th century Current Era (CE). The first Gulf War and its aftermath have shown the perverted role of human control over water in the Middle East (AMERY, 2002; ISSA *et al.*, 2013). More than a decade of drought in Iraq (AL-TIMIMI and AL-JIBOORI, 2013) (Figs 1-2), exacerbated by the deliberate and intensive drainage of the Mesopotamian marshes by Saddam Hussein's regime to evict the Shi'a Muslim population from the southern territories, created a social and environmental disaster (LAWLER, 2005; RICHARDSON and HUSSAIN, 2006; MACLEMAN, 2011).

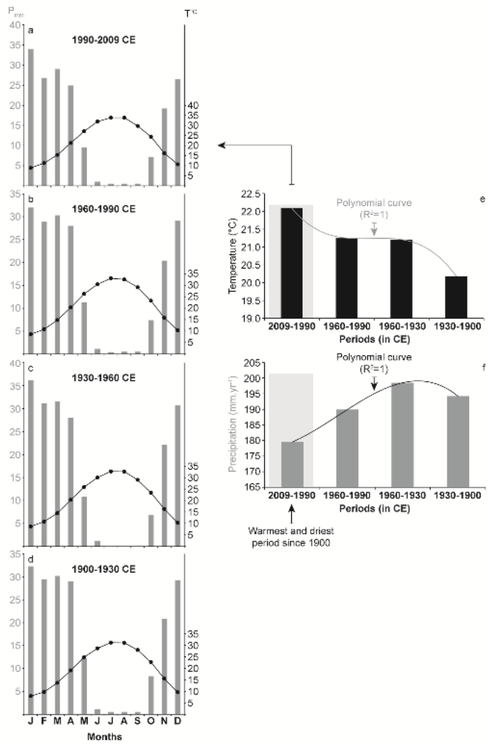
Figure 1 - Maps (longitude, latitude) showing the precipitation anomalies for the decade 1990-2000 CE (Saddam Hussein's regime) and for the period 3650-3750 BP (King Abieshuh's reign).



The anomalies are calculated *versus* the previous periods: 1901-1990 CE for Saddam Hussein's regime and 3750-3850 BP for King Abieshuh's reign. They are expressed as a percent of their 20th century CE average

MAPS CREATED AND DRAWN BY THE AUTHORS, USINg R SOFTWARE.

Figure 2 - Modern climate parameters displayed as ombrothermic diagrams and evolution of temperature-precipitation since 1900 CE



(a) Ombrothermic diagram for the period 1990-2009 CE; (b) ombrothermic diagram for the period 1960-1990 CE; (c) ombrothermic diagram for the period 1930-1960 CE; (d) ombrothermic diagram for the period 1900-1930 CE; (e) average temperature for each period plotted as a histogram and smoothed using a polynomial curve (R^2=1); (f) precipitation for each period plotted as a histogram and smoothed using a polynomial curve (R^2=1).

3 Until the 1970s, the Mesopotamian marshes had covered an area of up to 20,000 km^2, and had fed an estimated population of 250,000 Shi'as. Today, less than 10% of the original marsh and 20,000 of the original inhabitants remain. These southern marshes, primarily fed by the Tigris (Al-Hawized Marshes) and the Euphrates (Al-Hammar Marshes) or both (Qurna or Central Marshes), are considered by many to be one of the cradles of western civilization and are often referred to as the biblical “Garden of Eden” (RICHARDSON *e al.*, 2005). In Iraq, the Tigris, Euphrates, and the Mesopotamian marshes, have sustained social and urban development since the Ubaid period 7000 years ago (CARTER and PHILIP, 2010; HRITZ *et al.*, 2012). They not only constitute permanent sources of water, but also foster the abundant food stores that have supported socio-economic and cultural developments for so many millennia. But in the 1990’s, Saddam Hussein’s regime attempted to eradicate these people by destroying the marshes upon which they depended for survival (SICHERMAN, 2011). Massive canals were dug, diverting river water away from the southern wetlands (ADRIENSEN, 2004). Already damaged by drought (Fig. 1), much of the wetlands regressed, and people were forced to flee.

4 While the history of the ancient Middle East, and in particular of Babylonia, is well documented for the almost three millennia of its existence, periods of drought, economic decline, famine, chaos, turmoil and rebellion are, however, scarcely attested in the Mesopotamian literature. A parallel can be drawn between the paucity of literature for

these periods and the lack of climate reconstructions, leaving a blank in the Middle Eastern history.

5 Here we try to disentangle, by coupling climate modelling and the translation of cuneiform tablets, one of the little-known periods in the history of Iraq, and show that political repression by water deprivation during a drier period already occurred 3700 years ago in this country. A collection of 75 cuneiform tablets belonging to the archives of Cornell University (VAN LERBERGHE and VOET, 2009; ABRAHAM *et al.*, 2016) contains the first documented account of water deprivation as a weapon of war during a period marked by precipitation decline. The tablets, originating from the town of Dur-Abieshuh ("the walled fortress of Abieshuh", a name given by the Babylonian King Abieshuh [1711-1684 Before Current Era (BCE)], are all dated to the late Old Babylonian period (1750-1600 BCE). These Babylonian texts provide precious insights into what happened in Iraq following the decline of the Babylonian Empire of King Hammurabi (1792-1750 BCE). In particular, they provide evidence of socio-economic turmoil and rebellion across the entire region south of Nippur, the religious capital of Mesopotamia and its centre of learning. Even if the reign of King Abieshuh must never be compared and assimilated to a modern dictatorship, the excesses of Saddam Hussein's repressive regime 3700 years later illustrate that military strategies from 1700 BCE were still "en vogue" in the 20th century CE.

1 - Materials and methods

1.1 - Vegetation model and climate parameters

6 The precipitation of 3750-3650 Before Present (BP) was reconstructed using a data-model approach. The data include: (i) monthly temperature, precipitation and cloud cover gridded at a step of 0.5° from 1901 to 2000 CE, provided by the British Atmospheric Data Centre (CRU-TS-3-10); (ii) pollen data from the European Pollen Database to which four sites have been added, Bereket-Turkey (KANIEWSKI *et al.*, 2007), Tell Tweini-Syria (KANIEWSKI *et al.*, 2008, 2010), Akko/Acre-Israel (KANIEWSKI *et al.*, 2013a), and Hala Sultan Tekke-Cyprus (KANIEWSKI *et al.*, 2013b). The model is a vegetation model (BIOME4; KAPLAN *et al.*, 2003) that simulates the net primary productivity of broad vegetation types given the climate of each studied sites. A set of 81 grid-points has been considered for the climate reconstruction according to the pollen sites available.

7 Assuming that the pollen abundances are related to the net primary productivity added to a Gaussian distribution, it is possible to reconstruct the best climate scenarios giving the pollen composition. This procedure is called model inversion and is solved using a Bayesian approach (GUIOT *et al.*, 2009). Given the likelihood comparing BIOME4 outputs to pollen data and a range for the model parameter model (i.e., a climate scenario), Markov Chain Monte Carlo techniques produce a refined probability distribution of the parameters. The parameters are the 36 monthly climatic variables at 81 grid-points, which are summarized into two principal components to simplify the data. For each pollen assemblage (grouped into the 13 vegetation types of BIOME4), and at each iteration, the two parameters are transformed into a 36-size climatic vector and introduced in BIOME4 (in addition to the corresponding atmospheric CO_2 concentration and modern soil characteristics). The vegetation-simulated vector is compared to the pollen data according to a similarity measurement. Acceptable scenarios (according to

Markov Chain Monte Carlo rules; GELMAN and RUBIN, 1992) are used to estimate the probability distributions of the climate parameters.

8 We focus on annual precipitation. Verification is achieved by reconstructing modern climate from the pollen data at the 81 grid-points. The correlation coefficient between observed and reconstructed annual precipitation on the 81 grid-points is 0.81. The gradient between the driest and wettest grid-points is well-reproduced, but with an underestimation of high-precipitation values and an overestimation of the low-precipitation ones. So the bias is -294 mm for grid-points above 800 mm and 97 mm for grid-points below 200 mm. This is partly due to the fact that pollen sites are generally at a higher elevation than grid-points used for climatological data.

9 The underestimation of high-precipitation values probably comes from the herbaceous taxa, usually attributed to steppe or desert environments, which remain abundant in forest sites, therefore accentuating the impression of drought. To minimize these biases, the reconstructions are expressed as anomalies *versus* a reconstructed reference map (and not an observed one). Because we are here interested in the drought increase at about 3750 BP (Fig. 1), we calculated the relative anomalies map (P 3750-3650 BP - P 3850-3750 BP) relative to modern values (expressed in percentages). This map is compared to the recent map (P 1990-2000 CE - P 1900-1989 CE) relative to the modern (1900-2000 CE) mean values (Fig. 1).

10 The 20th century and early 21st century CE values on temperatures and precipitations that have been used to draw the four ombrothermic diagrams (from 1900 to 2009 CE) for Iraq (Fig. 2), are based on the available dataset.

1.2 - The cuneiform tablets from Iraq

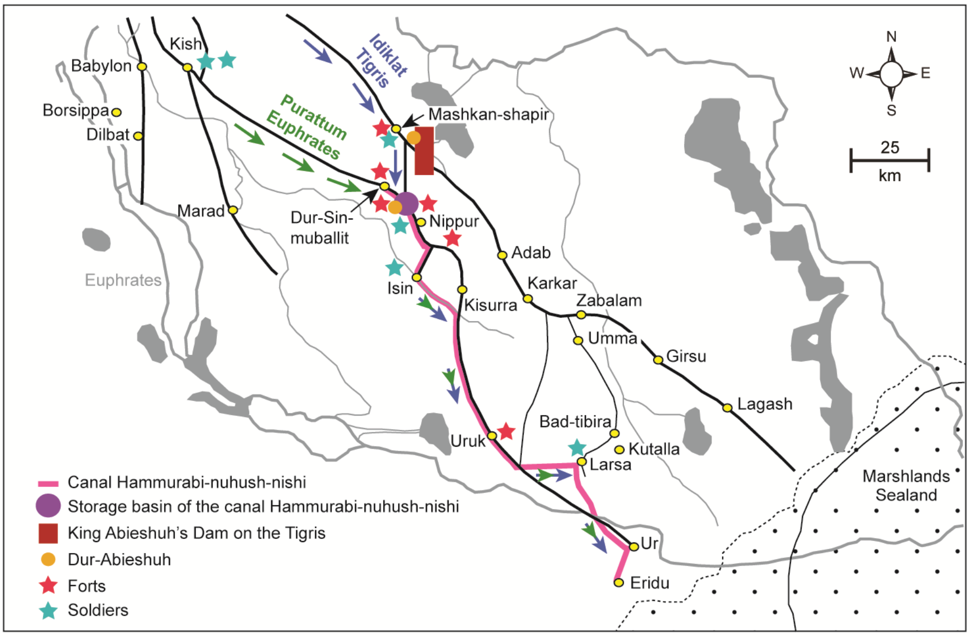
11 The dataset is primarily based on an archive of Mesopotamian cuneiform tablets stored at Cornell University. These recently published tablets reveal the dramatic events that happened in Babylonia circa (ca.) 3700 years ago when the Empire of the renowned King Hammurabi (1792-1750 BCE) abruptly declined under his son Samsuiluna (1749-1712 BCE). Babylonian central authorities lost control over the entire South, including the religious capital of Nippur, down to the Persian Gulf. The events, as described in this cuneiform material, offer a frightening picture of how fast a refined civilization can decline under changing environmental and political conditions in semi-arid regions such as Iraq.

12 The tablet collection at Cornell consists of over 10,000 items, dating from the fourth to the second millennium BCE. Within this collection, approximately 600 tablets (literary texts, oracles, religious texts, mathematic texts), written in the Babylonian and Sumerian languages, have been identified as belonging to one archive. The tablets making up the historical basis of this article (75 tablets) are detailed in CUSAS 8 and 29 (Cornell University Studies in Assyriology and Sumerology) where translations, transliterations, 2D+ copies and hand copies are given (VAN LERBERGHE and VOET, 2009; ABRAHAM *et al.*, 2016). One other isolated tablet (reference: WZKM 104 01) belongs to the "Kunsthistorisches Museum in Vienna" and is made public in an article in "Wiener Zeitschrift für die Kunde des Morgenlandes" (FÖLDI, 2014). The tablet collection is in its entirety at the Tablet Room, University Avenue 726, Cornell University, Ithaca, NY. The most important tablets are detailed as *supporting information*. A small group of 24 tablets related to the archive is stored in Norway. Digital pictures of all tablets and seals have

been taken and can be consulted at the Cuneiform Library website of Cornell University [http://cuneiform.library.cornell.edu/].

13 The archive originates from Dur-Abieshuh (Fig. 3), a name given by the grandson of King Hammurabi, Abieshuh.

Figure 3 - Geographical map of Sumer (southern Iraq) during the reigns of Samsuiluna and Abieshuh



The dam on the Tigris River built to dry up the southern marshes, the storage basin on the canal Hammurabi-nuhus-nishi, the whole canal, and the location of the two cities named Dur-Abieshuh are displayed. The blue and red stars denote the soldiers and forts respectively deployed to protect Babylonia. The location of the Tigris and Euphrates follows the hypothesis of Steinkeller (STEINKELLER, 2001) for the period 2100 BCE

MAP CREATED AND DRAWN BY THE AUTHORS, USINg ADOBE ILLUSTRATOR CS5)

14 The fortress was built on the canal Hammurabi-nuhush-nishi ("Hammurabi provides the people's prosperity"), a roughly 200-km-long canal that runs parallel to the Euphrates and which provided perennial water for the cities of Nippur down to the Persian Gulf. Not far from this fortress, a second town by the same name was erected on the Tigris, upstream of Abieshuh's legendary dam. The archive describes life in the military forts that were built along the Euphrates and enumerates all foreign mercenaries who populated these forts. Some of them are said to come from far-away regions such as Iran, northeast Syria and even Aleppo. Ration lists for troops stationed in the military garrisons, disbursements to military personnel and letters concerning the central and southern areas of Babylonia make up a significant part of the archive. Once Nippur fell out of control, the Temple of Enlil, the city's major deity, and its personnel moved from Nippur to Dur-Abieshuh. The cult centre of Nippur had fallen into disrepair at that time, as demonstrated by this prayer written on a scribe's seal to his private deity, Marduk: "May [the scribe] Nanna-mesha, who reveres the god Marduk, (live to) see the restoration of the Ekur temple and of Nippur".

15 During this period of drought and famine, the kings Samsuiluna and Abieshuh were confronted with an enemy, the King of the Sealand. One of them by the name of Ilima-

ilum even invaded Nippur, the "Babylonian city of the thousand temples". To defeat this frightening enemy whose homeland was in the Mesopotamian Marshes, Abieshuh built a dam on the Tigris to dry up the marshes. This daring project, never equaled by any other Babylonian king, was still remembered by the Babylonians a thousand years later. The Cornell archive gives unexpected evidence on how and where the dam was built and how the South of Babylonia was militarized all along the Euphrates River.

2 - Results and discussions

2.1 - Military forts

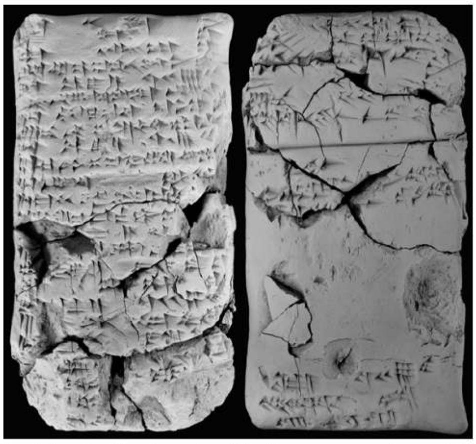
16 The Cornell archive firstly shows that, faced with chaos and rebellion in the South, King Abieshuh (8th king of the 1st Dynasty of Babylon) created an important network of military forts (*birtum* in Babylonian) all along the Euphrates River and the adjoining Hammurabi-nuhus-nishi Canal in order to control the water system that flows to the South and feeds the Mesopotamian Marshes (Fig. 3). These military camps (near Dur-Sinmuballit, Nippur, Dur-Abieshuh, Baganna and Uruk) had to ensure perennial water for important central Babylonian cities, such as Nippur and Isin, and the southern cities of Uruk, Larsa, Ur and Eridu (Fig. 3). Mercenaries living in these camps originated from settlements along the Euphrates such as Kish, Damrum, Nukar, Nippur, Isin and Larsa (Fig. 3). However, the Tigris was exclusively protected by one military fort, Mashkan-shapir (Fig. 3). The southern cities watered by the Tigris, such as Adab, Umma, Girsu and Lagash, are not once referred to as having fortified outposts or as providing mercenaries, even though these areas were very important during the preceding Ur III Dynasty (2100 to 2000 BCE) and the early Old Babylonian period (2000-1750 BCE). Apparently, these cities were abandoned by their inhabitants. These historical data are confirmed by the results of Adams' survey of southern Iraq. He remarks that the flow of the Adab-Umma Canal ceased entirely during the late Old Babylonian period and that the volume of water for irrigation was reduced by this time (ADAMS, 1981). It is also in accordance with the findings of geomorphological research in the areas around Nippur, where the absence of any substantial agriculture south and east of the heartland was recorded for the late Old Babylonian period (ARMSTRONG, 1994).

2.2 - A dam on the Tigris

17 The more insidious control of the Tigris' flow would have taken place just south of Mashkan-shapir. In the 19th year of his reign, King Abieshuh constructed a dam on the Tigris (Fig. 3). A late historiographical text and an oracle enquiry show that the damming of the Tigris was a military strategy of Abieshuh in his war with the Sealand enemy (CHARPIN, 2002; GEORGE, 2013). This was considered a key event of his reign. By diverting the waters of the Tigris towards the Euphrates, the king intended to dry up the Mesopotamian Marshes, the home of the Sealand enemy, thus, starving its population. The dam was also built to establish a more reliable water supply, *via* the Euphrates, for the southern territories that were under his military control.

18 A few years later, the king built a fortress called Dur-Abieshuh a few miles above the dam (GEORGE, 2013). A second walled town by the same name of Dur-Abieshuh was constructed at the storage basin of the Hammurabi-nuhush-nishi Canal (Fig. 4).

Figure 4 - Cuneiform tablet CUNES51-02-138 (oACBW, rACBW) from the Cornell Archive



Translation: Speaking to our Lord the King, your servants report the following. Our city and the Lord's troops are well. In the 11th month, on the 28th day, the citizens of Nippur, who have arrived here at the settlement **at the storage basin of the (Euphrates) River (most probably the town of Dur-Abieshuh)**, reported to us that in the 11th month, on the 19th day, 500 enemies with equids and footmen invaded Nippur. They entered the Ekur temple. ... The walls of the temple were pierced. ... (The authorities of Nippur) organized a razzia in the temple. ... They have repeatedly sent soldiers, ... and many horsemen fled. In the 11th month, on the 25th day, 300 enemies with equids have again penetrated the Ekur, ... and still today they are destroying the Ekur temple. They are attacking Nippur every day. This is what they have told us. We have written down the report as told by Mr Etelpu, and this is a copy of the letter. It has been sent by Mr Ilshu-ibnishu, the express-messenger, and by Mr Shumum-lishi, the overseer of the express-messengers. Dated to the 29th day of the 11th month of the 11th year of the reign of King Ammiditana.

The translation of the cuneiform tablet mentioning the invasion of the Ekur, the most important temple of Nippur's chief deity, and the arrival of refugees at the storage basin at King Abieshuh's fortress is displayed under the picture. The letter proves that even under Abieshuh's successor, Ammiditana, Nippur was still under attack from its Sealand enemies

Pictures and translation: Van Lerberghe).

19 Both Dur-Abieshuhs were located close to one another: one at the inlet of a channel near the famous dam on the Tigris, and one at the storage basin of the Hammurabi-nuhush-nishi Canal where the channel ended (Fig. 3). Canal workers from Babylon were employed to mix the waters of the Euphrates with, most probably, the Tigris (but these lines are unfortunately missing on the tablet CUNES51-03-095). The best place to divert the waters from the Tigris to mix them with the Euphrates would be at the inlet of a canal linking both rivers. Such canals were well known in Babylonia and one, just to the south of the fort of Mashkan-shapir, is attested for the Old Babylonian period (Fig. 3).

2.3 - Southern Iraq during the period of repression: a Dark Age?

20 After 1750 BCE, the major southern and central Babylonian cities (Ur, Uruk, Eridu, Isin, Girsu, Larsa; Fig. 3) seem to have been, at least partially, abandoned since no more cuneiform texts or archaeological material from that period have been excavated. Even Nippur, Babylonia's religious capital and centre of learning during the prosperous reign of King Hammurabi, became silent. The entire region south of Nippur sank into a Dark Age. Babylon lost control over these territories, and the flourishing economy of the Empire came to an end (UR, 2013). The southern territories gradually became impoverished and depopulated (PIENTKA, 1998; CHARPIN, 2004; DALLEY, 2009). A famine struck its population, and new ethnic groups started to threaten the central authority,

while citizens fled the country in search of better opportunities abroad (JANSSEN, 1991; VAN LERBERGHE and VOET, 2009). The scarcity of water was accentuated by relatively drier conditions (Fig. 1) that developed in eastern Turkey, the source of the Euphrates and Tigris (CULLEN *et al.*, 2002), and extended to the northern Red Sea (LAMY *et al.*, 2006) (Fig. 1).

2.4 - Control of the Tigris' flow reinforced by a dry phase 3750 years ago

21 High-resolution and well-dated climate records from the central and southern Euphrates-Tigris basin during the late Holocene are not available, but several records detail the climatic evolution over the regions surrounding the headwaters of the two rivers during that period (Fig. 1). Harvest-based gauges of climatic variations in Babylonia (NEUMANN and SIGRIST, 1978) and a pollen-based environmental record from the eastern mountains of Turkey (WICK *et al.*, 2003) point to reduced rainfall and high winter temperatures during the late Old Babylonian period (NEUMANN and SIGRIST, 1978), leading to a reduction of the Euphrates and Tigris flows and accordingly, increased soil aridity in southern dependant territories. The harsh environmental conditions that developed in Babylonia are consistent with hydroclimatic changes recorded in the southern Black Sea sediments that provide evidence for an unstable period with dry spells (CULLEN *et al.*, 2002), paralleling data from Lake Van in eastern Anatolia (WICK *et al.*, 2003). A dry shift (Fig. 1) was recorded in several places in the Aegean, Turkey and Syria (ROBERTS *et al.*, 2011), on the southern Levantine coast (SCHILMAN *et al.*, 2001; KANIEWSKI *et al.*, 2013a), on the Nile Delta (BERNHARDT *et al.*, 2012) and in the northern Red Sea (LAMY *et al.*, 2006) . During the reign of Hammurabi's successor, Samsuiluna (1749-1712 BCE), the flow of the Adab-Umma Canal ceased entirely (ADAMS, 1981) (Fig. 3). Babylonia was clearly a state in chaos during the reign of King Abieshuh, Samsuiluna's son and successor.

22 These climate records emphasize that Abieshuh's strategy occurred during a period marked by recurrent dry spells (Fig. 1). This provides a first parallel with Saddam Hussein's plan that was fully realized during the warmest and driest period since the onset of the 20th century CE (Figs 1-2). Abieshuh's plan, which is based on the drying up of the Mesopotamian Marshes in order to starve and weaken the Sealand, attains its true significance when the climate parameters are fully integrated. Natural drought probably accentuated the impact of deliberate water retention on human settlement and population migrations in southern Iraq 3700 years ago. As the marshes turned to dryland, marsh peoples were forced to flee their homes.

2.5 - Hidden in the Mesopotamian marshes: the Sealand enemy

23 The instability that followed the fall of the Empire offered local rulers the opportunity to create small regional kingdoms in the Mesopotamian Marshes and the Persian Gulf. They attributed themselves the royal title "King of the Sealand", as attested by several legal tablets from Nippur (DALLEY, 2009). Due to repeated attacks, the Sealand, in the far south of Mesopotamia, became an enemy of great concern for Babylon (e.g. the photo of the Babylonian letter from Cornell on the attack of Nippur; Fig. 4). Even though the Babylonians remembered the strategy of drying up the Mesopotamian Marshes by diverting the Tigris for a thousand years to come, the late historiographical text

describing Abieshuh's bold enterprise mentions that his efforts were to no long-term avail (GEORGE, 2013). The king never succeeded in defeating his enemy. The recent publication of an archive of 463 tablets from the 1st Sealand Dynasty shows that Sealand kings still controlled vast areas of Babylonia from the South to the North at the end of the Old Babylonian and beginning of the Kassite period (DALLEY, 2009).

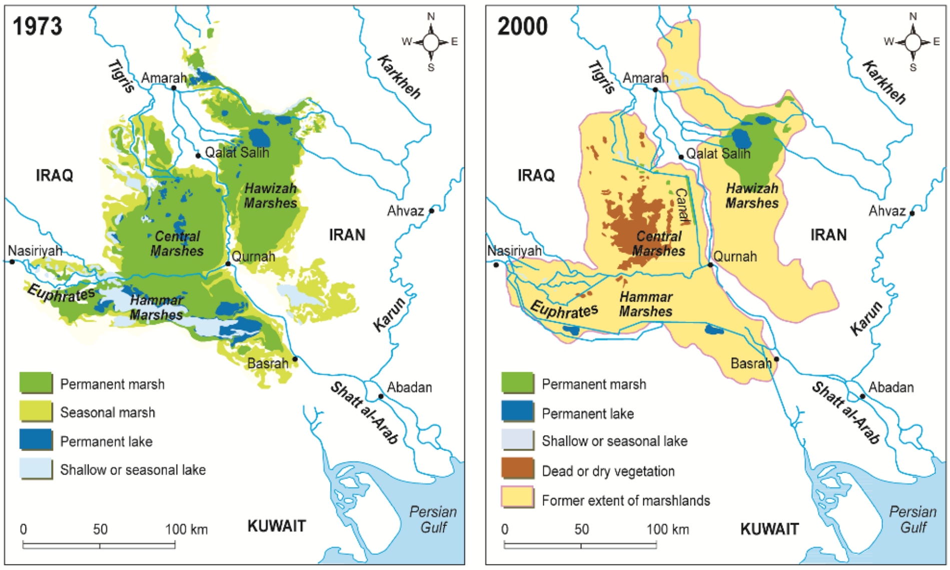
2.6 - The destruction of the Iraqi marshlands

24 In Iraq, the Babylonian story told by the cuneiform tablets shows that the scarcity of water resources can be leveraged as an efficient means of pressure on southern societies that depend on marsh areas (now called Marsh Arabs or Ma'Dan). Two-thirds of Iraq is dryland, and the country is highly dependent on the Euphrates and Tigris for irrigation. King Abieshuh's strategy of drying up the Mesopotamian Marshes by diverting the Tigris and inhibiting its southwards flow is the first written testimony of the deliberate deprivation of freshwater that would later be reiterated by many others (GLEICK and HEBERGER, 2013) including the Saddam Hussein's regime (AMERY, 2002; ISSA *et al.*, 2013).

25 The first modern plans for the drainage of the marshes of southern Iraq date back to the 1950s CE when British engineers proposed a series of canals, embankments and sluices on the Euphrates and Tigris in order to divert salty and polluted water away from the irrigated area between the two rivers (PEARCE, 1993). Saddam Hussein appears to have reinvented these constructions for his own purposes, but with a different aim.

26 Saddam Hussein's first plans for the marshes date back to the period of 1980-88 CE, during the Iran-Iraq war (ADRIENSEN, 2004), and were underpinned by the desire to control Iranian intruders entering Iraq through the marshes. The plan, which forecasts a destruction of the marshes, was fully realized at the end of the first Gulf War in 1991 CE. The Ma'Dan, who had lived for thousands of years in these marshlands, were forced to flee the area and find refuge in southern Iran when Saddam Hussein's regime built a network of canals, dykes and dams to divert water away from the marshes. By 2000-2002 CE, satellite images showed that only 7-10 % of the marshlands were left (RICHARDSON and HUSSAIN, 2006). The only remaining marsh was the northern portion of Al-Hawizeh, which straddles the border between Iran and Iraq (Fig. 5). The Qurna and Al-Hammar marshes were destroyed by 2000 CE (Fig. 5). The remaining Al-Hawizeh was only 35% of its size in 1977 CE (RICHARDSON and HUSSAIN, 2006).

Figure 5 - The destruction of the Mesopotamian marshes



These two maps (1973 and 2000) are sourced from satellite images and maps originally created by PARTOW (2001) and modified by REKACEWICZ (2002).

27 King Abieshuh's plan bears a striking resemblance to the much later one of Saddam Hussein. While the Babylonian kings officially proclaimed that they wanted to establish a more reliable water supply, by digging a canal along the Euphrates, for the southern cities, which had been devastated by harsh climatic conditions (Fig. 1), the cuneiform tablets have revealed that the real goal of King Abieshuh was primarily to weaken and starve the Sealand during wartime by damming the Tigris and diverting its waters. A historiographical text written 1000 years later also indicates that "Abieshuh, son of Samsuiluna, tried to defeat Ilima-ilum (King of the Sealand), so decided to dam the Tigris, but though he dammed the Tigris, he did not defeat Ilima-ilum". A fragmentary Sumerian inscription of a ruler who took the epithet "king of the Tigris" built "a gate against the rebel lands". It has been suggested that this text belongs to Abieshuh and alludes to the dam.

28 During Saddam Hussein's era, the official Iraqi justification was that the project would improve the agricultural sector and would increase the amount of water available for irrigation (NORTH, 1993). Documents found during the liberation of Iraqi Kurdistan in 1991 CE revealed that the real goal was primarily to make the marshes controllable as they were used as a hiding ground for Iraqi outlaws, dissidents, and opponents of the regime, and then to make the Marsh Arabs an easy target for Saddam Hussein's forces (ADRIENSEN, 2004).

Conclusions

29 This interdisciplinary study shows that, even if water deficits will probably not be the cause of major armed conflict in the Middle East, deprivation of freshwater may be leveraged as a powerful military tool. This tool reveals to be particularly efficient for the periods marked by weak inputs of freshwater (low precipitation, weak karstic resurgence,

dry aquifer). While more than three millennia separate the reign of King Abieshuh and the regime of Saddam Hussein, their military strategy focused on deprivation of freshwater supplies and their plans to starve southern Iraq were definitely equivalent, showing the power conferred by a perverse control of water during wartime. These two examples, as well as the other ancient and recent abuses worldwide (GLEICK and HEBERGER, 2013), clearly indicate that the water war could be a far more deviant use of scarce water resources, especially in the context of ongoing climate change. The recurring role of water resources as a political issue through time is clearly highlighted when integrating ancient and modern history within environmental sciences.

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ABSTRACTS

Oil, which sparked the first Gulf War, is not the only liquid resource that may trigger global crises from within a Middle Eastern theater. Water - or the lack of it - could be a cause of future conflicts because it is the most precious natural resource that can be manipulated and controlled by humans. Here, we report the written evidence for the diversion of the Tigris for repression purposes in Iraq, 3700 years ago, during a period marked by precipitation decline. Our study shows the perverted role of human control over water in the Middle East, using freshwater supplies as a weapon of war, especially at times when drought may have affected the inhabitants, leaving them weak and vulnerable. The translation of 75 cuneiform tablets from the Cornell Archive has revealed the development of military forts for the protection of the Babylonian heartland, and has highlighted one of the oldest known attempts to dry up the Mesopotamian marshes to starve the southern lowlands. Independent palaeoenvironmental data and climate modelling show that relatively drier conditions may have increased the efficiency of this military strategy.

Le pétrole, qui a déclenché la première guerre du Golfe, n'est pas la seule ressource capable de générer des crises mondiales à partir du Moyen-Orient. L'eau - ou l'absence d'eau - pourrait être une cause de conflits dans un futur proche, car cette ressource naturelle est l'une des plus précieuses qui peut être manipulée et contrôlée par l'homme. Dans cet article, nous rapportons l'une des plus anciennes preuves écrites connues du détournement du Tigre à des fins de répression en Irak, il y a 3 700 ans, durant une période marquée par un important déclin des précipitations. Notre étude montre principalement le rôle pervers du contrôle de l'eau au Moyen-Orient, notamment l'utilisation des sources d'eau douce comme arme de guerre, en particulier pour des périodes où la sécheresse peut avoir affecté les habitants, les laissant faibles et vulnérables. La traduction de 75 tablettes cunéiformes provenant des archives de la Cornell University a révélé le développement de forts militaires permettant d'assurer la protection de Babylone et a mis en évidence l'une des plus anciennes tentatives d'asséchement des marais mésopotamiens afin d'affamer ces plaines du sud. Les données environnementales et climatiques montrent que des conditions relativement sèches peuvent avoir augmenté l'efficacité de cette stratégie militaire.

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Geographical index: Moyent-Orient, Irak, Mésopotamie, Tigre, Euphrate, Babylone
Keywords: Water, Paleo-environment, drought, war, bronze age
Mots-clés: eau, Paléo-environnement, sécheresse, guerre, âge du bronze

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