First Steps towards Reviving Franke's 'Chinese Epigraphy in Southeast Asia': Motivations, Approaches and Data Structures

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Abstract

The goal of this research project is to transform the paper-based and barely accessible Documentation of Chinese Epigraphy produced by Wolfgang Franke and his colleagues (WFCEM) into a permanently archived and freely accessible repository of standardized data that overlays the original documentation with state-of-the-art imagery, enhanced data, geo-localizations and a continuation of the prose describes of sites, object and inscriptions. Doing this we also hope to increase the awareness in various research communities of the

existence of this extraordinarily rich resource, but also raise the awareness of those who manage and administer the cultural sites of the treasures history has laid into their hands.

此次研究計畫目標在於：將傅吾康先生與其友人的紙本印刷的東南亞華文碑刻銘彙文件，轉化成永久歸檔且容易取得的標準化資料庫，覆蓋了原始文檔，包含最先進的圖像、高品質的數據、地理定位，並有註解描述圖片的地點、物品和銘文。藉由此研究，希望能增強各種研究團體對於墓誌銘等珍貴資源的意識，也能提高歷史性文化遺址管理者的意識。

1 Introduction

Chinese Epigraphy in Southeast Asia counts among the most important sources for the region's social and religious history in the last three hundred years. Countless inscriptions in temples and graveyards are often the only dated witnesses of local Chinese communities. Digitally aggregated, these records could be analyzed on a much wider scale than previously possible. Based on more than a decade of experience recording tombstone inscriptions on Taiwan, Penghu, and Okinawa,[1] we have begun to work on a "Digital Database of Chinese Inscriptions in SEA", all the while reshaping our conceptual model to conform to the CIDOC Conceptual Reference Model (CRM), for the representation of sites, and to TEI, for the representation of inscriptions.

1.1 Epigraphy

An epigraph is an inscription carved into an object composed of hard material, such as stone, wood or metal.

The main distinctive features of epigraphs are their uniqueness and their context-dependency. Epigraphs, tend to remain on the site or the object on which they have originally been created. It is the unique site and the unique object which contribute to the meaning of the epigraph. This is particularly the case where deictic expressions are used to refer, e.g., to a village as ' 本村' (běn cūn, this village), or ' 本廟' (běn miào, this temple), instead of using the name of the village or temple. Likewise, the oldest tombstone, the largest tombstone and the only granite tombstone obtain these properties only within a set of tombstones. People's names obtain meaning from nearby shops, factories and temples, and family relations show how within a community families established and maintained their economic power.

Second, the object, its size and material, the tools, and the training of the carver influence what and how an epigraph ultimately materializes. These factors determine genre, style, format, as well as character and semantic variants. Soft materials facilitate the carving of small characters or characters composed of many strokes, while hard or brittle materials tend to show large or simplified character variants, e.g. ' 顕' vs. ' 顯' (xiǎn, an honorific) or semantic variants, e.g. ' 旦' (dàn) vs. ' 穀' (gǔ) (in the sense of 'auspicious'). Thus, what seems to be a paradigmatic opposition represents only a contextual variant, if the conditions of the production are considered. Contextualization thus minimizes the danger of overinterpretation.

Beyond the conditions of production, the conditions of the reception of the epigraph too are encoded. An epigraph typically assumes a certain posture towards the reader, perhaps in front of a tomb, or a temple gate, or at the top of a mountain. Not only the stone, but also the assumed position of the readers determine the size and the orientation of the carving.

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[1]The ThakBong database contains 330.000 images of 682 graveyards in Taiwan and its outlying islands, see http://thakbong.dyndns.tv/.

The type of the object, e.g. tombstone or ancestral tablet, will influence the wording, especially in the case of referential linguistic expression on , tombs (mù 墓) or ancestral tablets (shénweì 神位).

These features of epigraphs have fundamental implications for research and documentation. Instead of visiting libraries, which collect copies of texts and make them available, researching epigraphs requires the researcher to visit the places where epigraphs were carved or where the objects have been erected in order to document the potential contexts which affect the interpretation of the inscription.

Therefor rubbings or photos of epigraphs, stored in libraries, can only partially replace the object. Beside the properties typical of epigraphs, discussed above, also the spatial properties of the epigraph might have been lost. These include longitude and latitude of the object, the altitude, the bearing of the object in degrees from the north line and the orientation of the object in terms of the spatial configuration within a set of culturally relevant objects of a site. Epigraphs tends to be embedded within a physical space that represents, as symbolic space, social arrangements in a community. The placement and orientation of tombstones, ancestral tablets, donor steles, bells, yunban, censers, couplets or wooden tablets within a temple are thus meaningful since symbolic arrangements and contain clues how an epigraph can to be interpreted.

The value of an epigraph thus derives from its unique position at the intersection of humanities, the science of man-made products, and the social sciences, the science of human behavior. An epigraph combines text, material and object, and has been created by specific agents at specific times, at specific places, in relation to specific events within which they fulfill a specific functions. A wooden tablet attached to the roof of a temple, for instance, is inscribed with the year of its creation, with that space and time, two essential coordinates, are already known. Additional data can be associated , e.g. the content can be transcribed and translated, actors can be identified. Each epigraph is thus a node in a network that can be linked to historical, sociological, anthropological, geographic, linguistic, or economic data, with the potential to change our perception of the past.

1.2 Wolfgang Franke (1912-2007)

Wolfgang Franke was a well-known German Sinologist who taught in Hamburg University. He was the son of Otto Franke (1863-1946), the founder of German Sinology. After his retirement in 1977 Franke moved to Malaysia, where he continued to teach and pursue his research. Originally a specialist of the Ming Dynasty, Franke, perhaps influenced by the destruction of cultural assets during the Cultural Revolution (1966-1975), began to work on a large-scale photographic documentation of Chinese epigraphs in Southeast Asia. We will refer to this multi-volume survey of Chinese epigraphy in Malayasia, Indonesia, and Thailand as the Wolfgang Franke Chinese Epigraphic Materials (henceforth WFCEM).

Franke assembled a large and effective team of collaborators that included renown scholars such as Chen Tieh Fan, Claudine Salmon, Anthony Siu and Porpan Juntaronanont, among others. How this team worked is almost undocumented and more research is needed to reveal how this team was able to collaborate successfully for such a long time.

Figure 1   Wolfgang Franke (1912-2007)

2   Franke's Documentation of Chinese Epigraphy in Southeast Asia

2.1   Achievements

Building partially on data collected earlier in his career, Wolfgang Franke began to intensify his fieldwork and assemble and publish a multi-volume documentation of Chinese epigraphic materials in Malaysia, Indonesia, and Thailand, covering the time span from the late Ming period to the 1950s (Franke & Fan, 1983), (Franke *et al.*, 1988), (Franke *et al.*, 1997), (Franke & Juntaronanont, 1998a), (Franke & Juntaronanont, 1998b). He and his team were assisted by local scholars who were often crucial in identifying the oldest and most relevant epigraphs in a region.

In two decades, the team around Wolfgang Franke documented and published approximately 10,000 inscriptions, the oldest and most relevant inscriptions they were able to find in the second half of the 20th century. This epigraphy is considered a crucial source for the study of oversea Chinese communities in Southeast Asia. Although in its present form it is difficult to access and cumbersome to use, it is absolutely indispensable for the serious study of Chinese religion and history in Southeast Asia.1. In total, the team around Wolfgang Franke published eight volumes on South East Asian Chinese epigraphy, each volume containing approximately 1000 epigraphs.

Not only is the content of WFCEM highly significant, also its style and format has become a model for subsequent documentation projects, such as the Chinese Epigraphs in Singapore (Dean & Hue, 2016), in Malaysia (黃文斌, 2013; 张少寬, 2013; 吉隆坡, 2014), in Taiwan (Streiter *et al.*, 2011b; Streiter *et al.*, 2011a; Streiter *et al.*, 2011c; Streiter & Morris, 2016), on Penghu (Streiter & Goudin, 2016; 奧利華，林莉倫，陳乃瑜，莫詹姆，詹雅晴, 2016; 奧利華 & 詹雅晴, 2016), in Hong Kong (鄧家宙 & 陳覺聰, 2012), and Chinese Migrants in France (Goudin & Streiter, 2016). Claudine Salmon, having worked with Wolfgang Franke and being listed as editor and collaborator in WFCEM, continued to work on Chinese epigraphies in Vietnam (Salmon & Cac, 1998) and Indonesia (Salmon & Archipel, 2016)).

The volumes of WFCEM are organized by country and region. Volume 1 of "Indonesia", for example, covers Sumatra and Volume 2 covers Java. Some cartographic material
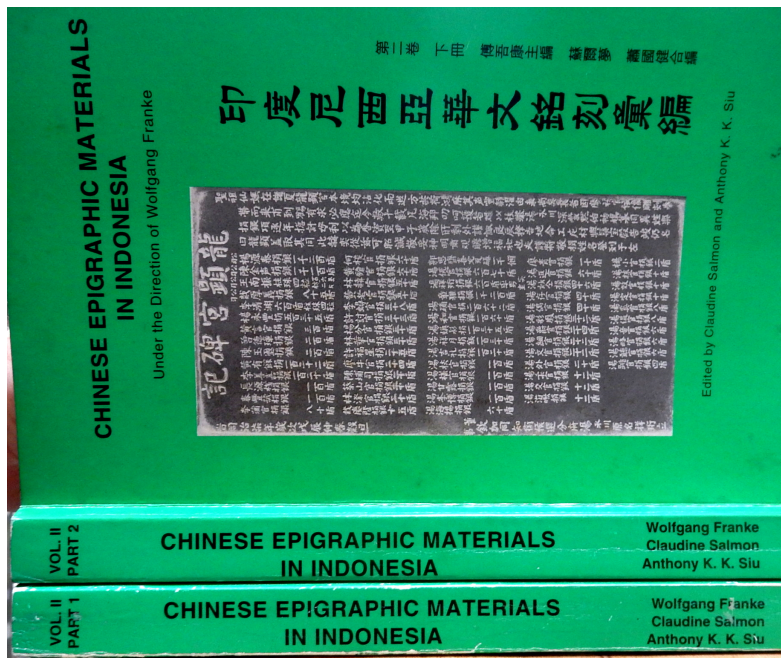
Figure 2   Chinese Epigraphic Materials in SE Asia, the cover of IDN-IIa and IDN-IIb"

has been included, mapping the earliest finds for each administrative region, cf. 3. Sometimes however, additional material from regions documented in earlier volumes has been included in later volumes, making an extensive search in the books more difficult.
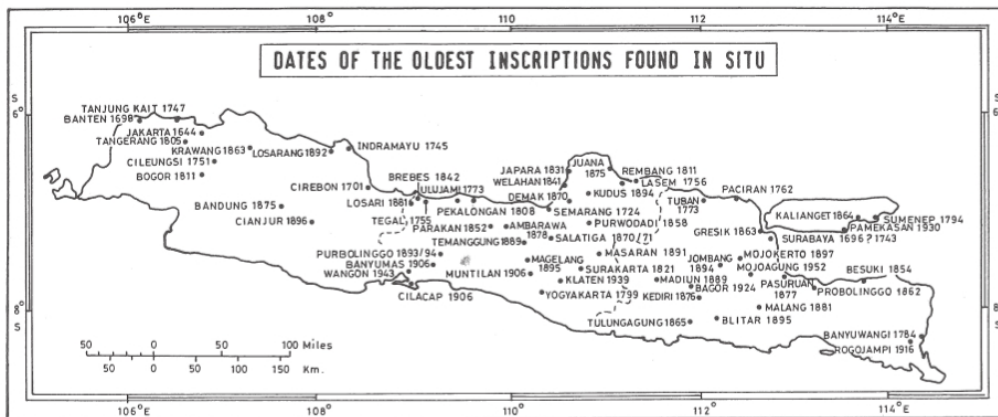

Figure 3   Chinese epigraphic materials in SE Asia. A map of the oldest inscriptions found on Sumatra, in IDN-IIa"

WFCEM is indexed, using hierarchic alpha-numeric codes, which will facilitate the conversion of Franke's material into modern database formats, as Franke's hierarchical codes match the conceptual distinctions we find today in the CIDOC-CRM Conceptual Reference Model:locations, sites within locations, objects within a site, and inscriptions on objects.[2]

In Franke's coding system, *K*, stands for central Java, *K1* for Semarang, with *K1.13* for

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[2]The CIDOC-CRM Conceptual Reference Model, designed for implementation in database formats, describes the implicit and explicit concepts and relationships used in cultural heritage documentation. The CIDOC-CRM standard is one of the formal standards into which we will transform WFCEM.

Table 1   *Summary of Wolfgang Franke Chinese Epigraphic Mat. (WFCEM)*

Short Reference	Authors	Year	Title	Pages	Publisher
MYS-I	W. Franke and Chen Tieh Fan	1983	Chinese Epigraphic Mat. in Malaysia, Vol. 1	1–441	Univ. of Malaysia Press, Kuala Lumpur
MYS-II	W. Franke and Chen Tieh Fan	1983	Chinese Epigraphic Mat. in Malaysia, Vol. 2	442–970	Univ. of Malaysia Press, Kuala Lumpur
MYS-III	W. Franke and Chen Tieh Fan	1983	Chinese Epigraphic Mat. in Malaysia, Vol. 3	971–1510	Univ. of Malaysia Press, Kuala Lumpur
IDN-I	W. Franke, C. Salmon and Anthony Siu	1988	Chinese Epigraphic Mat. in Indonesia, Vol. 1	1–429	South Seas Society, Singapore
IDN-II	W. Franke, C. Salmon and A. Siu	1997	Chinese Epigraphic Mat. in Indonesia, Vol. 2	430–870	South Seas Society, Singapore
IDN-III	W. Franke, C. Salmon and A. Siu	1997	Chinese Epigraphic Mat. in Indonesia, Vol. 3	871–1294	South Seas Society, Singapore
THN-I	W. Franke and Por-pan Juntaronanont	1998	Chinese Epigraphic Mat. in Thailand	1–786	Xin Wenfeng, Taipei

a specific graveyard and *K1.13.1* for the first tombstone in this graveyard. Likewise *K1.3* represents a temple and *K1.3.1* an inscription in that temple. Generally, the first character represents a larger administrative regions, a two-character-code a town or village, a three-character-code a site and and four-character-code an objects that bears and inscription. Sites can be graveyards, temples, schools or residences. Items can be tombstones, wooden tablets, steles, censers, couplets, sculptures etc.

Using this simple coding system, Franke had no means to describe complex relations among objects, such as the inclusion of one object in another. E.g. the relation between an altar, a couplet at the altar and each part of the couplet could not be formally expressed in his notation.

Generally, WFCEM provides one photo for each epigraph, a normalized transcription and a relatively literal and uncritical translation. In the normalized transcription, character variants are normalized throughout. The transcriptions are Üncritical" in the sense that the content of the inscription is presented as fact. A placename, e.g. *Tong'an* is usually translated as *from Tong'an*, no matter whether the person migrated from that place, whether the ancestors migrated from that place or the ancestors are believed to have migrated from that place. Likewise the sons and daughters are always translated to have *erected* the tombstone, although they might also just have sent money or the tombstone might have been erected without their knowledge or consent. he translations should ideally matched with family genealogies, where available. Non-factual inscriptions expressing attitudes or identities, such as 皇清 (huángqīng, of the August Qing Dynasty), are not translated and not explained. In total, the team around Wolfgang Franke published eight volumes on South East Asian Chinese epigraphies, each volume containing an estimate of 1.000 epigraphs.[3]

The way Franke and his team selected and presented the material reflect a deep under-

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[3]The exact number of epigraphs will only be known after the project has been completed, as Franke frequently grouped related epigraphs under one number.
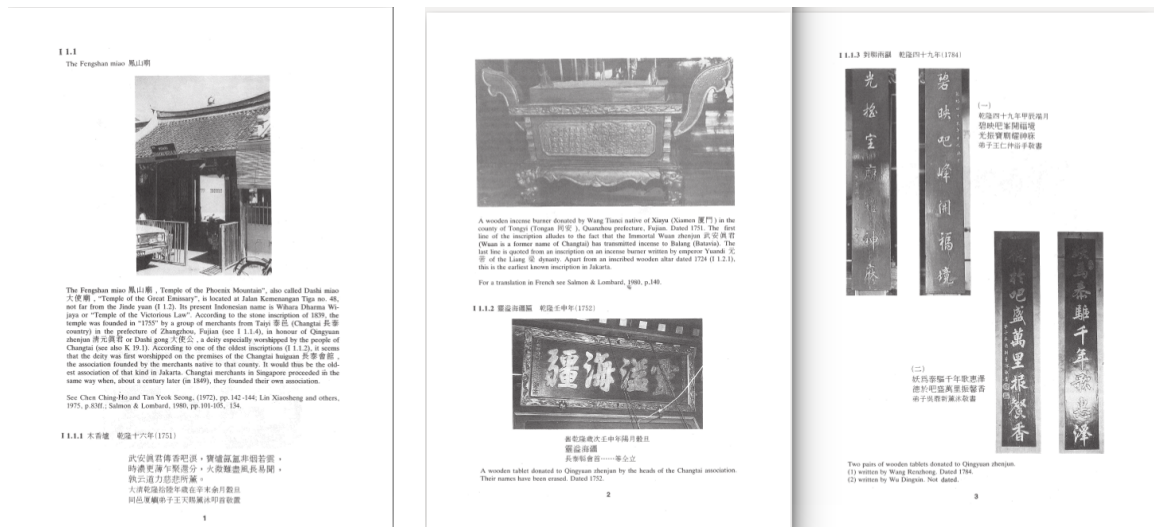
Figure 4   Chinese Epigraphic Materials in SE Asia, an example page of IDN-IIa, showing the Site Ī.1 and objects Ī.1.1 to Ī.1.3

standing and appreciation for local cultures, histories and languages. Temple names, for example, are romanized in Southern Min where that was the local language. Inscriptions in Bahasa Malay or Peh-oe-ji are equally documented along with inscriptions in Chinese, Japanese, Arabic and Thai. Where Mandarin is romanized, the earlier volumes on Malaysia use Wade-Giles, later volumes use Hanyu Pinyin.
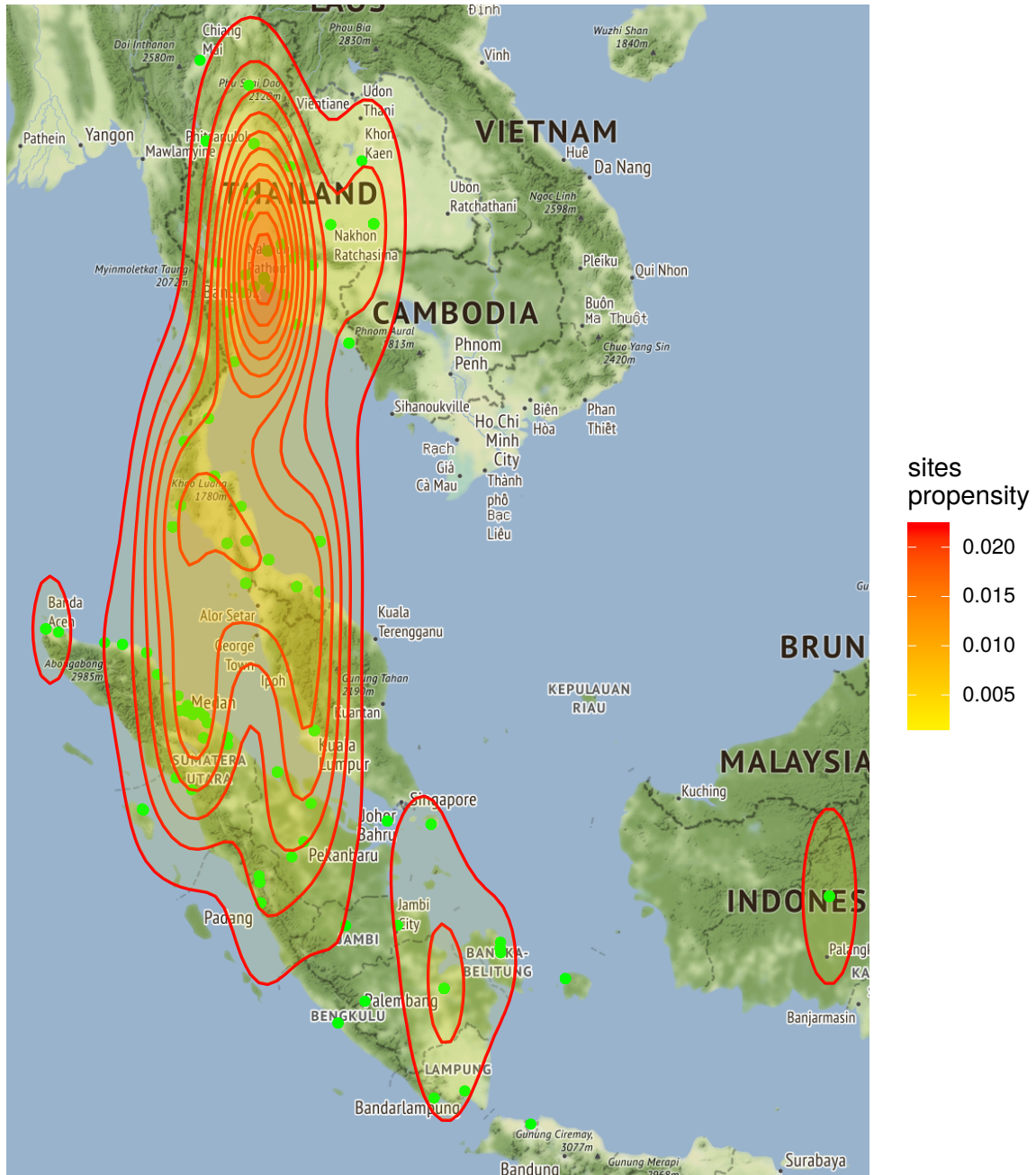
Figure 5   Pilot Study: The spatial distribution of some sites extracted from WFCEM. Once completed these maps will guide our fieldwork.
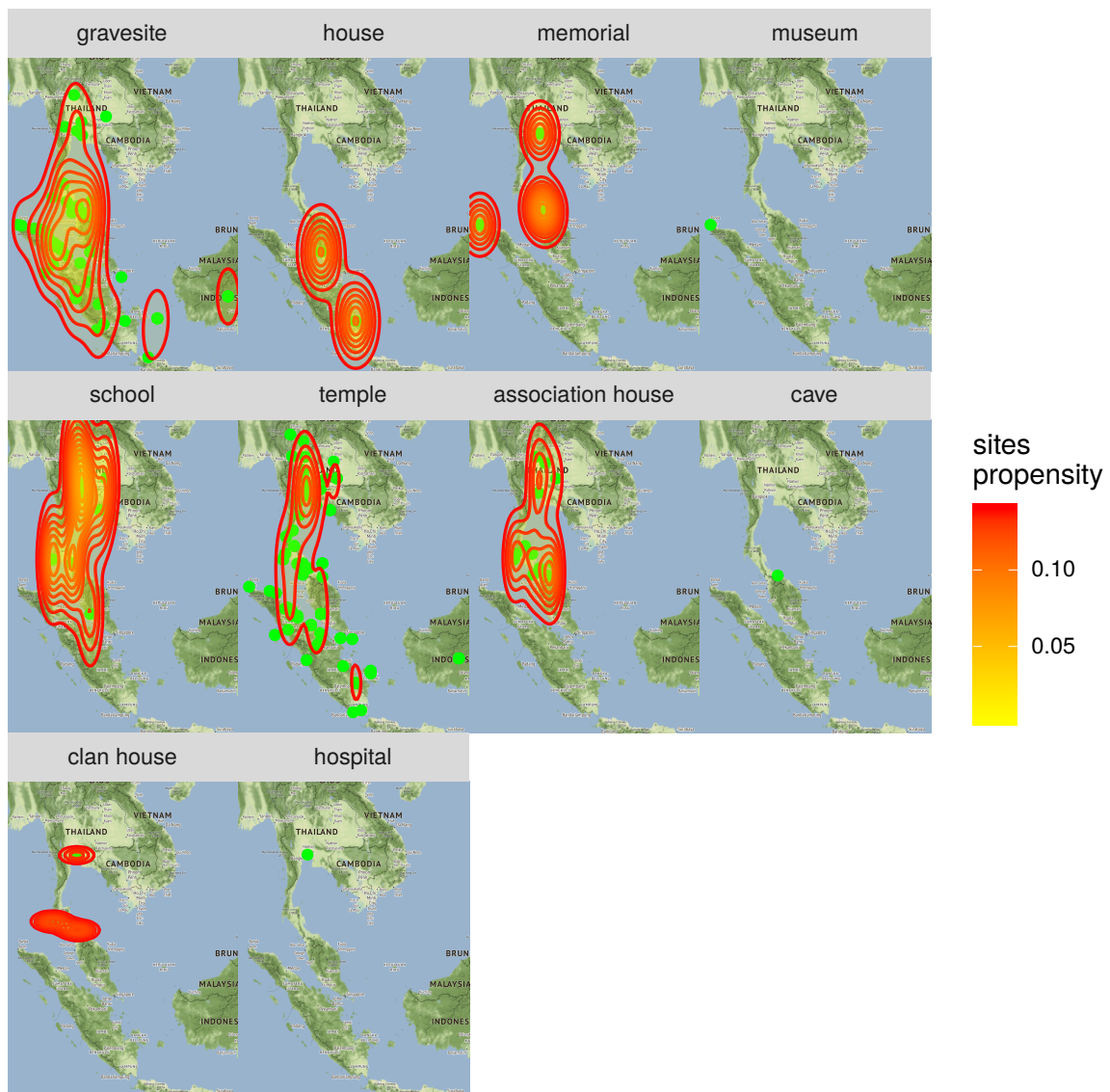
Figure 6　Pilot Study: The spatial distribution of some sites extracted from WFCEM, split by the type of site

B 2.3
Kuang-tung i-shan 廣東義山, the Cantonese cemetery, is located outside the town.
It was founded in 1915.

B 2.3.1 廣東義山亭門額　　民國十六年 (1927)


中華民國十六年立
廣　東
義山亭
黃寇卿敬書

A stone inscription above the entrance to the cemetery resthouse written by Huang
Shih-ch'ing. Dated 1927. The same person wrote a tablet in the Ch'ao-chou hui-
kuan, Kuala Lumpur, see No. A 1.27.1.

Table 2   *Entrance to the Guangdong Graveyard in Batu Pahat: Left side photo in MYS-I, right side photo taken in August 2018, adding color, motifs, GPS-location and direction. Note, that the date '中華民國十八年立' is in the transcription but not on the photo on the left side.*

B 1.3.1 華僑殉難紀念碑　　民國三十六年 (1947)
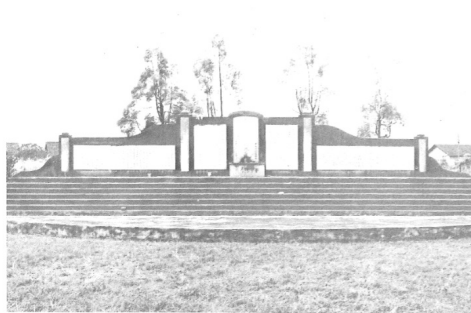
柔佛新山區華僑殉難紀念碑記

Table 3   *Tomb and memorial in Johor: Left side photo in MYS-I, right side photo taken in August 2018. The improvement in the quality of photos is obvious in this comparison. In addition, about 50 more photos have been taken in this site during our field trip in August 2018, which all can be made available in a digital medium, but not on a paper-based medium.*

2.2   Shortcomings

By today's standards, the black-and-white photography seems rather primitive. In order to improve the readability of carved characters, Franke's teams used chalk that was rubbed into the inscriptions.[4]. On the images the material of the chalked object becomes almost impossible to assess.

Although most photos in WFCEM have been taken *in situ*, objects are depicted in isolation from their site. E.g. we find photos of tombstones, without photos of the tomb, of wooden tables without photos of the temple.

Except for one overview map per book (e.g. Figure 3, WFCEM lacks, an analytic component that visualizes and interprets the bulk of collected data. Timelines, maps, social networks, and linguistic analysis are only implicitly encoded in the transcriptions and the descriptions that WFCEM provides for each object. Once the information is digitized, it becomes computationally accessible and can be analyzed and visualized in various ways.

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[4]This method, effective as it is, is today depreciated, not only for cultural reasons. Chalk is very abrasive and will provide food for lichen and fungus which will further destroy the stone. In addition, it contain a cocktail of chemical substances that might react with the stone and accelerate the degradation of the material

B 2.4
Lin-shih tsung-tz'u 林氏宗祠 or Chiu-lung t'ang 九龍堂，the Ancestral Temple of the Lin lineage.

B 2.4.1 九龍堂匾　　民國二十一年 (1932)

民國廿一年
九龍堂

A wooden plate with the name Chiu-lung t'ang, dated 1932.
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Table 4　*A wooden tablet in the Jiulongtang Lin family temple in Batu Pahat: Left side photo in MYS-I, right side photo taken on in August 2018. On the recent photo, the plaque has been renovated and the original date ' 民國廿一年' has been replaced by ' 歲次壬申' and disambiguated on the left side with ' 西元一九三二年立'.*

The full potential of the WFCEM could be enjoyed by the growing research community that studies Chinese communities in SE Asia.

3　Research Goals and Objectives

3.1　Revisiting and Re-Documenting WFCEM Sites - Result of a pilot study

Our aim is to re-visit as many sites as possible, to re-document the epigraphs once documented in WFCEM, and to identify and document new material. We intend to get better photos and more data, such as:information on symbols and motifs otifs, cf. Figure 2, GPS-localization, orientation, localization within the site, material, size, etc. We will also document the transformation of the epigraphs. Some were change on purpose, e.g. in Figure 4, some change is due to environmental reasons of the site, as shown in Figure 3. Others are due to degradation or abandonment of the site, or to an inappropriate storage.

In the pilot study, we aimed to get a general view on what happened in the last thrity years in the regions we visited. Of the 49 sites we visited in Malaysia, 34 had been visited before by Wolfgang Franke and his team. Of them, 33 were accessible and in the same place as 30 years ago. One temple has moved, one has completely burned down and has been, like most others reconstructed. This reconstruction work took a took a heavy toll on the objects and epigraphs once documented in these temples. Destroyed by the community, destroyed during the reconstruction, moved into sheds or simply unfindable or stolen, about 50% of the objects and epigraphs documented by Franke seen to have been lost. Of those epigraphs still available, many are being stored under inadequate conditions, among tools, paint cans, roof tiles and scaffolds. Rummaging in sheds, however, revealed epigraphs that Wolfgang Franke either did not have found or not documented, adding an extra value to our pilot study.

3.2　Processing Fieldwork Material and Data

Each digital file, each photo, video or audio, is annotated with meta-data that refer to the field trip (date, technique, researcher), the site, the object and all the particularities of the item. We also classify the data files as to which photo is the best photo showing the epigraph, the best photo showing the environment of the epigraph, a photo showing mea-

surements, a photos showing parts of the epigraph, photos documenting our fieldwork in relation to that epigraph, etc. Pieces of information that cannot be transcribed, such as motifs and symbols are mentioned in the meta-data as well.

3.3 Scanning and OCRing of WFCEM

All books of WFCEM are now scanned in the highest possible resolution at the National University of Singapore, by a team under the leadership of Kenneth Dean. Dean and his associates have also kindly shared a georeferenced dataset listing the locations of the original Franke sites.

On these these scans we have applied bilingual Chinese and English OCR (optical character recognition) to produce a bilingual docx-document on the basis of ABBYY FineReader. Besides recognizing the Chinese and English texts, the OCR attempted to identify and preserve the images in bilingual docx output. The preserved images can be extracted automatically with Pandoc. Where the OCR did not recognize an image, the image has to be cut manually from the scans. Likewise, OCR mistakes must be corrected manually in the docx output. This can be done semi-automatically for the English text, using a spelling checker. Chinese OCR output, e.g. the names of temples and sites, and the transcriptions of the epigraphs, must be proofed manually.

The irregular layout of the pages in WFCEM is a major challenge for OCR, c.f. Figure, c.f. Figure 4. In the printed volumes, English paragraphs, Chinese paragraphs and photos are mixed in creative ways in order to allow for the maximum of photos and texts on one page. Frequently, the OCR software thus attempts character recognition on images (especially as many depict visible characters), turning the photo incorrectly into text. The photo thus disappears from the docx output-file and has to be manually cut from the scan.

3.3.1 Transforming OCRed Scans into a Intermediate Annotation Format (IAF)

After the final corrections of OCR mistakes, we transform the output of the OCR into a format which is easy to understand and easy to manipulate, and to compute with. Scripts running over this intermediate representation can add redundant information, insert GPS-data, or correct obvious mistakes.

The IAF (Intermediate Annotation Format) follows closely the structure that underlies the hierarchically organized entries in WFCEM. An example of this format for the first entries in IDN-IIa is given in Appendix A.

3.3.2 Entity Recognition (ER)

Entity recognition refers to the recognition, extraction and storage of references to people, places and temporal units and their relations, such as events, rituals, locationzation etc. Sources from which entities are recognized are the metadata of epigraphs, the transcriptions of epigraphies, the translation of epigraphies and the prose description of sites and objects provided in WFCEM.

The IAF contains already in isolated forms entities and of entity relations, e.g. in the table of content, in the names of temples, and in the transcribed date. These entities can be searched and indexed in the textual elements. From the recognized entities, templates can be compiled which interactively allow to extract more entities. Entities are searched extensively before their relations are identified. The steps we will followed are:

the extraction of entities

the storage of entities in an intermediate entity database

the extraction of relations

the storage of relations in an intermediate entity relation database

the transfer of the intermedate entity and entity relation database into the XML TEI markup and into CIDOC-CRM.

Examples of the Intermediate Entity Database (IEDB) and the Intermediate Entity Relation Database (IERDB) are reproduced in Appendix B and Appendix C. In all these processing steps we follow a three-step procedure.

Fully automatic processing with a high degree of confidence, e.g. a full match of unambiguous entities.

Semi-automatic processing with a lower degree of confidence, e.g. the system ask an expert for confirmation when different entities match onto one string,

Fully manual processing for cases that are too complex or too ambiguous to be recognized or handled automatically. E.g. the foundation date cannot be extracted automatically from IDN-IIa C5.1 (”*The only, rather new Chinese temple of the small town.*”)

3.3.3   Conceptualizing Models in TEI and CIDOC-CRM

One of the main purposes of our research is to represent WFCEM in standardized digital formats, to stimulate related research in various research communities. The two standard formats we will use in the creation of WFCEM in digital formats are TEI and CIDOC.

TEI (Text Encoding Initiative) is the main standard for text-based research in the humanities. Linguistists, historians, anthropologists, literary scientists and information scientist collaboratively created this standard and share their annotated data for interdisciplinary research. With TEI we will create a digital representation of the volumes that Wolfgang Franke has created. The TEI representation can be digitally archived by librarians and serve as a master format of other output formats, e.g. a website or a PDF file. Sites documented during our fieldwork, which have not already been documented in WFCEM, will in a first step not be elaborated in TEI.

n contrast to TEI, which is used by textual studies and historians, CIDOC-CRM is used mainly by anthropologists, archaeologists, museum scientists and professionals involved in the management of archaeological or heritage sites. With CIDOC-CRM the focus of description shifts from the text to the site and its objects, their relations to other objects and the transformation they underwent. We record all sites, even those not previously documented by Franke, in this model. The CIDOC-CRM standard has been developed from 1996 under the auspices of the ICOM-CIDOC-CRM (International Council for Museums – International Committee on Documentation) Documentation Standards Working Group. The CIDOC-CRM model is an object-oriented ontology and can be implemented in various formats, of which the most commonly used is RDF (Resource Description Framework). In 2006, the International Organization for Standardization (ISO) adopted CIDOC as standard ISO 21127:2014, called ”*Information and Documentation: A Reference Ontology for the Interchange of Cultural Heritage Information*”.

The focus of CIDOC-CRM lies on the formal description of cultural heriate objects, their locations, periodization, their connections etc..

CIDOC-CRM is not desigend as an all-comprising standard. Instead, it is one standard in the CIDOC-CRM family of models, which can be combined according to the needs of a project. Additional complementary standards are CRMgeo (a spatiotemporal model), CRMinf (an argumentation model), CRMsci (a scientific observation model), CRMdig

(a model for provenance metadata), CRMba (a model for archaeological buildings), CR-Marcheo (an excavation model), FRBRoo (a model of intellectual processes) and PRES-Soo (a model of underlying semantics of bibliographic information). However, none of these standards is nearly complete to formally represent the inscriptions on the object and their linguistics features. TEI will thus not only be used to represent the documentation published in WFCEM, but also to represent the inscriptions further referenced by CIDOC-CRM.

The example of a TEI annotation is shown in Appendix D for the objects shown in Figure 4. Entities collected in the IEDB have already been annotated in that example.

The TEI files produced this way can serve many purposes. They can be accessed by visualization tools, e.g. for the creation of timelines, maps and social networks, or by statistics programs for theory testing. Alternatively the TEI files can be presented as hypertexts in HTML or PDF. The tranformation from a TEI format into another human-readable format is performed through XSLT style-sheets. One example for the result of such a transformation, a simple visualization as HTML hypertext is shown in Appendix E.

CIDOC data, which by definition follow an object-oriented model, is created by adding relations to the set of relations that the object entertains. The resulting data can be part of a database system or used (and distributed) in XML format.

3.4   Analyzing the Data Using Digital Techniques: GIS, Timelines and Social Network Analysis

The data, when summarized in generalizing views, reveal common patterns that tell us how communities usually developed. The development of a community that deviates from these common patterns may have its cause in a particular history that either can be directly pinpointed at by the data or that an extended research might reveal.

Wolfgang Franke, for example reasons that the onset of epigraphy in a community depends on a certain level of technical, literary and cultural development.[5]. From there he assumed that epigraphy, once started, developed simultaneous across media there should be a common and general onset of epigraphs, and that, for instance, the earliest tombstones and the earliest wood tablets had been carved at about the same time.

Persuing this idea, we have digitized a few pages of IDN-IIa. Then we have plotted the year of the carving of the extracted epigraphs, their object types and the name of their respective community. As can be seen in Figure 7 and Figure 8, in some communities the onset of tombstone and tablet carvings did indeed occurr, as Franke assumed, in the same period. Inscriptions on altars and censers, however, tend to occur later, and mostly together, while bells, usually imported from China, show no regularity with respect to when they have been ordered and installed. We might therefore argue that bells depend less on the cultural than on the economic development, in as far as its wealth allowed to purchase the expensive bronze bells. The appearance of temple bells, imported of locally produced, might thus serve as a marker for an economic development that can be used to compare communities, regions and countries.

Where the first gravestones appear long after wooden tablets, such as in Pematang Siantar, or vice versa, such as in Bengkalis, researchers would have to find a reason in the local history of these communities to explain these particular distributions. For Pematang Sinatar, Wolfgang Franke himself, apparently surprised, noticed that "*no tombstones of the late Qing or early Republican area were found*". This illustrates how ditial approaches can

---

[5]Introduction to MYS-I, pg. 6: "*From overall experience it can be established as a rule that at a certain town or settlement the earliest dates of inscribe objects in a temple of other building correspond roughly to the earliest tombstone dates.*"
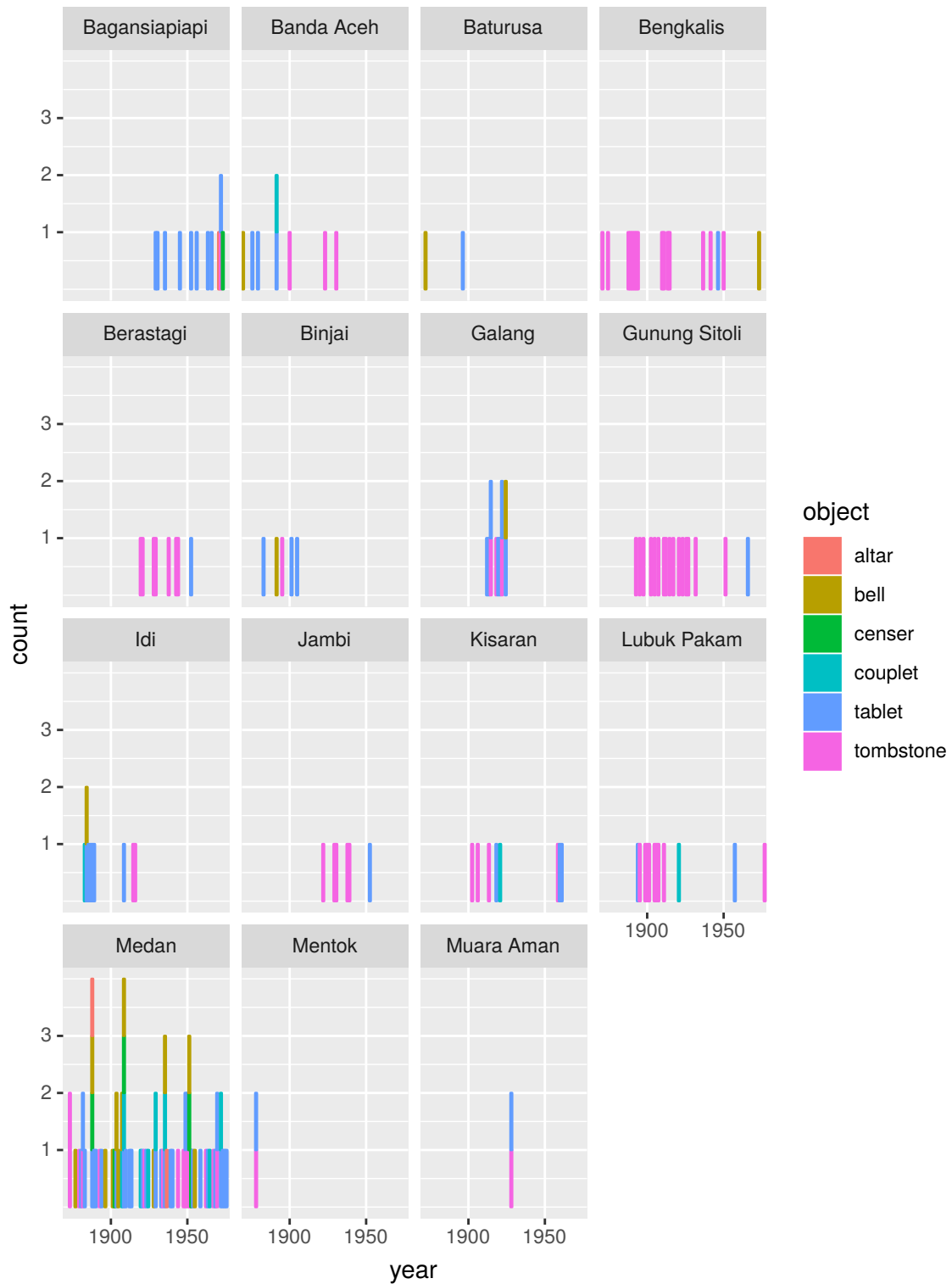
Figure 7 Pilot Study: The first occurences of epigraphs on objects of different types, split by the location in Indonesia

deted deviations from regular patterns, promting researchers to look deeper into a region of site. Withou data visualization, nobody would assume that there might be a story.

4 Conclusion

Digitizing and formalizing WFCEM is a daunting task. Yet, filling gaps in Franke's documentation and following the traces of more than thousand sites and roughly ten thousand epigraphs is an even greater challenge. While few researchers might start with this task, its completion will have to rest on many shoulders.

As the expected outcomes of this project can be predicted to be highly significant for many researchers and research communities, we hope that more and more researchers might join this effort. It thus will become necessary to find a social, organizational and computational structures that would support this long-term collaborative effort, similar to the collaboration that formed the bases for the creation of WFCEM. As this cultural heritage is eroding day by day, no time has been left to wait.
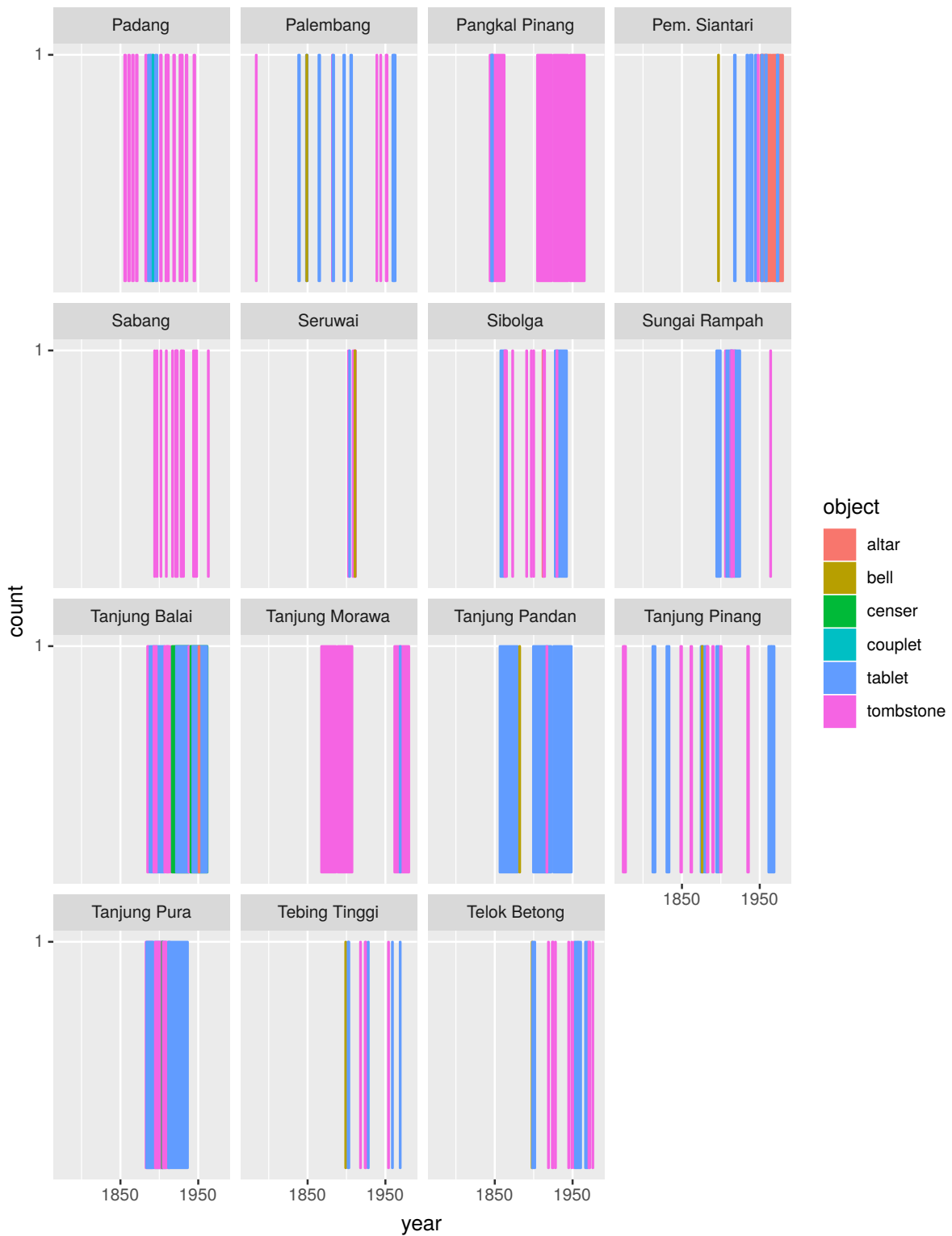
Figure 8   Pilot Study: The first occurences of epigraphs on objects of different types, split by the location in Indonesia (continued)

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A An Example of the Intermediate Annotation Format (IAF)

```
typ:loc
loc:region
tic:印度尼西亚；亞齊
ide:A
tie:Indonesia; Aceh
nor:4.695135
eas:96.7493993
complete:y
===:
typ:loc
loc:village
ide:Ā
tic:印度尼西亚；亞齊；班達亞齊，大亞齊
tie:Indonesia; Aceh; Banda Aceh
inf:Former name Kota Raja 古打拉惹, is the capital of Aceh Province.
eas:95.3237559
nor:5.5482904
complete:y
===:
typ:sit
ide:Ā.1
sit:museum
tic:印度尼西亚；亞齊；班達亞齊，大亞齊；博物館
tie:Indonesia; Aceh; Banda Aceh; The Museum in the centre of the town
eas:95.3149826
nor:5.5479392
complete:y
===:
typ:obj
ide:Ā.1.1
obj:bell
mat:bronze
tic:印度尼西亚；亞齊；班達亞齊，大亞齊；博物館；鐘銘
tie:Indonesia; Aceh; Banda Aceh; The Museum in the centre of the town; \
Bronze bell
dat:成化五年冬月吉日造
yea:1469
img:2.jpeg
eas:95.3149826
nor:5.5479392
complete:y
inf:A large bronze bell, 1.25 m high and 0.75 m in diameter, suspended ...
```

The codes used in this representation are:

typ: type, possible values *loc*, *site* or *obj* for locations, sites and objects respectively,

loc: the kind of locality, possible values *region* or *village* for larger administrative units or cities, towns or villages,

sit: the kind of site, possible values *museum*, *house*, *temple*, *school*, *memorial site* or *gravesite*

obj: the kind of object, possible values are *altar*, *bamboo tube*, *bell*, *censer*, *couplet*, *gate couplets*, *horizontal wooden tablets*, *lion*, *memorial stone*, *niche*, *pillar*, *stele*, *tablet*, *tombstone* and *yunban*,

tic: the Chinese name of the location, site or object,

tie: the English name of the location, site or object,

ide: the identifier assigned in WFCEM

nor: the latitude of the location, site or object, not provided in WFCEM

eas: the longitude of the location, site or object, not provided in WFCEM

inf: textual explanations provided in WFCEM,

yea: the year of the creation, erection or establishment of the object, site or location

img: the image associated with the site or object

B An Example of the Intermediate Entity Database (IEDB)

Each entity is stored with its type, e.g. 'person', 'date', 'event' etc, all expression that refer to that entity, e.g. '黃公華生' and a unique identifier for each entity, e.g. '1'. For each entity the source of its identification is retained.

id	entity.id	entity.type	entity.reference	source
1	1	tombstone	黃華生之墓	WFCEM entry: 黃華生之墓
1	2	inscription	黃華生之墓	WFCEM entry: 黃華生之墓
1	3	person	黃華生	WFCEM entry: 黃華生之墓
4	3	person	Huang Huashen	WFCEM entry: 黃華生之墓
5	4	date	民國三四年	WFCEM entry: 黃華生之墓
6	4	date	公元一九四五年	WFCEM entry: 林媽之墓
7	5	location	粤邑	WFCEM entry: 黃華生之墓
8	6	material	concrete	WFCEM entry: 黃華生之墓

C An Example of the Intermediate Entity Relation Database (IERDB)

The relations are stored temporarily in triples, the subject, the predicate and the object of the relation. In addition, for each entity the semantic role in which it stands to the relation is stored. Again for each relation, we retain its source.

id	entity1.id	entity1.role	relation	entity2.id	entity2.role	source
1	2	theme	contain	1	location	entry: 黃華生之墓
2	1	theme	create	4	date	entry: 黃華生之墓
2	2	theme	create	4	date	entry: 黃華生之墓
2	2	theme	create	4	date	entry: 黃華生之墓
2	3	theme	jiguan	5	location	entry: 黃華生之墓
2	1	theme	create	6	material	entry: 黃華生之墓

D An Example of a TEI Encoding

```xml
<?xml version="1.0" encoding=ÜTF-8"?>
<?xml-model
href="http://www.tei-c.org/release/xml/tei/custom/schema/relaxng/
   tei_allPlus.rng" type=äpplication/xml" schematypens="http://
   relaxng.org/ns/structure/1.0"?>
<?xml-model href="http://www.tei-c.org/release/xml/tei/custom/
   schema/relaxng/tei_allPlus.rng" type=äpplication/xml"
   schematypens="http://purl.oclc.org/dsdl/schematron"?>
<TEI xmlns="http://www.tei-c.org/ns/1.0">
<teiHeader>
<fileDesc>
<titleStmt>
<title> Chinese Epigraphy in SEA - Ind 2 - Ī.1 - Fengshan miao 鳳
   山廟</title>
</titleStmt>
<publicationStmt>
<p> Part of this data is digitized from W.Franke (s.b.), other
   parts were collected by the authors in the course of their
   fieldwork.</p>
<p> The data that was collected as part of the project "Chinese
   Epigraphy in Southeast Asia" 2019-2021, is published under a
   Creative Commons License (CC BY-SA 4.0).</p>
</publicationStmt>
<sourceDesc>
<p> Page breaks and page numbers below refer to <bibl> Franke,
   Wolfgang, Claudine Salmon, Anthony Siu. 1988-1997. Chinese
   Epigraphic Materials in Indonesia. Vol. II: Java (1997).
   Singapore: South Seas Society.</bibl></p>
</sourceDesc>
</fileDesc>
<encodingDesc>
<geoDecl datum="WGS84">106.8119 6.1427</geoDecl>
<listPrefixDef >
<prefixDef ident="image"
matchPattern="([a-z]+[123][a-z]*-[0-9|_|-]*[a-z])"
replacementPattern="https://ourwebsite.net/facsimileView/getImage
   .xql#$1.png">
<p> Constructs public URLs from the private URI</p>
</prefixDef>
</listPrefixDef>
</encodingDesc>
</teiHeader>

<facsimile> <!-- This lists all images of a single site in the
   system, whether by WF or us, whether used in the text or not.
   File extension can be added by prefixDef. -->
<graphic resp="WF" url="image:ind2I-1_1a"/> <!-- Indonesia, Vol
   .2, Part 1, Region Letter I, Site Number 1.1., Photo/Image a,
   (caught by ([a-z]+[123][a-z]*-[0-9|_]*[a-z]) -->
<graphic resp="WF" url="image:ind2I-1_1-1a"/> <!-- Indonesia, Vol
   .2,
Region Letter I, Site Number 1.1., Object Number 1,
Photo/Image a, -->
<graphic resp="WF" url="image:ind2I-1_1-2a"/>
<graphic resp="CESEA" url="image:ind2I-1_1b"/>
<!-- Our photos of that site would go here -->
```

```xml
</facsimile>

<text>
<body>
<div1 n="#ind2I-1_1" resp="WF" ><!-- Site level, references site
    ID from authority, Basically all the info for now is from
    Franke so default is @resp="WF". We can add our data on sites
    and objects into the text by using @resp="CESEA" -->
<head><pb n="1"/> The Fengshan miao 鳳山廟</head>
<figure><graphic url="image:ind2I-1_1a"/></figure>
<p> The <placeName> Fengshan miao 鳳山廟</placeName>，"Temple of
    the Phoenix Mountain", also called <placeName> Dashi miao 大使
    廟</placeName>，"Temple of the Great Emissary"，is located at
    Jalan Kemenangan Tiga no. 48, not far from the Jinde yuan (<
    ref target="#ind2I-1_2"> Ī.2</ref>). Its present Indonesian
    name is <placeName> Wihara Dharma Wijaya</placeName> or "
    Temple of the Victorious Law". According to the stone
    inscription of <date>1839</date>, the temple was founded in "<
    date>1755</date>" by a group of merchants from <placeName>
    Taiyi 泰邑</placeName> (<placeName> Changtai 長泰</placeName> <
    choice><sic> country</sic><corr resp="CESEA"> county</corr></
    choice>) in the prefecture of Zhangzhou, Fujian (see <ref
    target="#ind2I-1_1-4"> Ī.1.4</ref>), in honour of <persName
    type="deity" key="#d0001"> Qingyuan zhenjun 清兀眞君</persName>
     or <persName type="deity" key="#d0001"> Dashi gong 大使公</
    persName>, a deity especially worshipped by the people of
    Changtai (see also K 19.1). According to one of the oldest
    inscriptions (<ref target="#ind2I-1_1-2"> Ī.1.2</ref>), it
    seems that the deity was first worshipped on the premises of
    the <placeName> Changtai huiguan 長泰會館</placeName>, the
    association founded by the merchants native to that county. It
     would thus be the oldest association of that kind in Jakarta.
     Changtai merchants in Singapore proceeded in the same way
    when, about a century later (in <date>1849</date>)，they
    founded their own association.</p>
<p> See <bibl> Chen Ching-Ho and Tan Yeok Seong, (1972), pp.
    142-144</bibl>; <bibl> Lin Xiaosheng and others, 1975, p.83ff.
    </bibl>;
<bibl> Salmon &amp; Lombard, 1980, pp. 101-105, 134</bibl>.</p>
<div2 xml:id="ind2I-1_1-1"><!-- object level division-->
<head> Ī.1.1木香爐乾隆十六年(1751)</head>
<ab type="transcription" facs="image:ind2I-1_1-1a">
<lb/>武安眞君傳香吧浪，寶爐氳氳非烟若雲，
<lb/>時濃更薄乍聚還分，火微難盡風長易聞， 孰云道力慈悲所薫。
<lb/><date from-iso="1751-04-26" to-iso="1751-05-24"> 大清乾隆拾陸
    年歲在辛未余月</date> 穀旦 <lb/>同邑廈嶼弟子王天賜薫沐叩首敬置</ab>
<!-- there is a lot more one could mark up in the
inscriptions: Writing direction, variants, sections,
names, with better images one can tie text passages
to zones on the image. Anyway, the book text needs to
go first. -->
<pb n="2"/><figure><graphic url="image:ind2I-1_1-1a"/></figure>
<p> A wooden incense burner donated by <persName type="person"
    key="#p00001"> Wang Tianci</persName> native of <placeName>
    Xiayu</placeName> (<placeName> Xiamen 度門</placeName>) in the
     county of <placeName> Tongyi</placeName> (<placeName> Tongan
    同安</placeName>), Quanzhou prefecture, Fujian. Dated <date
    >1751</date>. The first line of the inscription alludes to the
```

```xml
     fact that the <persName key="#deity0002"> Immortal Wuan
zhenjun 武安眞君</persName>. (Wuan is a former name of Changtai
) has transmitted incense to <placeName> Balang</placeName> (<
placeName> Batavia</placeName>). The last line is quoted from
an inscription on an incense burner written by emperor <
persName type="DDMperson" key="#A002426"> Yuandi 元帝</
persName> <!-- this is a name already contained in the DDM
authority db, we could also use CBDB --> of the Liang 梁
dynasty. Apart from an inscribed wooden altar dated <date
>1724</date> (<ref target="#ind2I-1_2-1"> Ī.2.1</ref>), this
is the earliest known inscription in Jakarta.</p> <p> For a
translation in French see <bibl> Salmon &amp; Lombard, 1980, p
. 140</bibl>.</p>
</div2>

<div2 xml:id="ind2I-1_1-2"><!-- object level division -->
<head> Ī.1.2 靈溢海疆區 乾隆壬申年(1752)</head>
<figure><graphic url="image:ind2I-1_1-2a"/></figure>
<ab type="inscription" facs="image:ind2I-1_1-2a">
<lb/>峕<date from-iso="1752-11-06" to-iso="1752-12-05">乾隆歲次壬申
年陽月</date>穀旦<lb/>靈溢海疆<lb/>長泰縣會<del rend="erasure"><
gap unit="chars" quantity="3" cert="low"/></del>等仝立</ab>
<!-- with erasure and illegible passages we use the epidoc style
markup http://www.stoa.org/epidoc/gl/latest/trans-erasedlost.
html --> <p> A wooden tablet donated to <persName type="deity"
key="#d0001"> Qingyuan zhenjun </persName> by the heads of
the Changtai association. Their names have been erased. Dated
<date>1752</date>.</p>
</div2>
</div1>
</body>
</text>
</TEI>
```

E   An Example of a TEI visualization

An example of the objects of Ind-IIa shown in Figure 4 and encoded in TEI as shown in Appendix D, transformed into an HTML hypertext. This HTML visualization is one of many possible visualizations that can be created and tuned through style-sheets.

Chinese Epigraphy in SEA - Ind 2 - I 1.1 - Fengshan miao 鳳山廟

Table of contents

1. The Fengshan miao 鳳山廟   [Page 1]

The Fengshan miao 鳳山廟, "Temple of the Phoenix Mountain", also called Dashi miao 大使廟, "Temple of the Great Emissary", is located at Jalan Kemenangan Tiga no. 48, not far from the Jinde yuan (I 1.2). Its present Indonesian name is Wihara Dharma Wijaya or "Temple of the Victorious Law". According to the stone inscription of 1839, the temple was founded in "1755" by a group of merchants from Taiyi 泰邑 (Changtai 長泰 [county]) in the prefecture of Zhangzhou, Fujian (see I 1.1.4), in honour of Qingyuan zhenjun 清兀眞君 or Dashi gong 大使公, a deity especially worshipped by the people of Changtai (see also K 19.1). According to one of the oldest inscriptions (I 1.1.2), it seems that the deity was first worshipped on the premises of the Changtai huiguan 長泰會館, the association founded by the merchants native to that county. It would thus be the oldest association of that kind in Jakarta. Changtai merchants in Singapore proceeded in the same way when, about a century later (in 1849), they founded their own association.

See *Chen Ching-Ho and Tan Yeok Seong, (1972), pp. 142-144; Lin Xiaosheng and others, 1975, p.83ff.; Salmon & Lombard, 1980, pp. 101-105, 134.*

1.1. I 1.1.1木香爐乾隆十六年(1751)

武安眞君傳香吧浪, 寶爐凱氳非烟若霎,
時濃更薄乍隙遇分, 火微鵝盡風長易間, 執云道力慈悲所薰。
大清乾隆拾陸年歲在辛未余月觳旦
同邑廈嶼弟子王天賜薰沐叩首敬置

A wooden incense burner donated by Wang Tianci native of Xiayu (Xiamen 廈門)in the county of Tongyi (Tongan 同安), Quanzhou prefecture, Fujian. Dated 1751. The first line of the [Page 2] inscription alludes to the fact that the Immortal Wuan zhenjun 武安眞君. (Wuan is a former name of Changtai) has transmitted incense to Balang (Batavia). The last line is quoted from an inscription on an incense burner written by emperor Yuandi 元帝 of the Liang 梁 dynasty. Apart from an inscribed wooden altar dated 1724 (I 1.2.1), this is the earliest known inscription in Jakarta.

For a translation in French see *Salmon & Lombard, 1980, p. 140.*

1.2. I 1.1.2 靈溢海疆匾 乾隆壬申年(1752)

峕乾隆歲次壬申年陽月觳旦
靈溢海疆
長泰縣舍 [...]等仝立

A wooden tablet donated to Qingyuan zhenjun by the heads of the Changtai association. Their names have been erased. Dated 1752.

F The Mapping of WFCEM Entity Types onto CIDOC-CRM Entities

CIDOC-CRM makes a principal distinction between entities and properties, where properties describe the relations between the entities. Entities include objectc, their parts and their surrounding. The basic entity types used in WFCEM, mapped onto CIDOC-CRM Entities.

WFCEM entity type	CIDOC-CRM Entity	Example
objects	E19 Physical Object	I1.1.1 木香爐乾隆十六年 (1751)
persons	E21 Person	Wang Tianci
sites	E27 Site	The Fengshan miao 鳳山廟
photo	E31 Document	photos
title	E35 Title	Indonesia Sibolga Guanyinting
foundry	E40 Legal Body	Dingxin Co., Hongkong
location name	E41 Appellation	”Batavia”
date	E49 Time Applelation	大清乾隆
date	E50 Date	大清乾隆拾陸年歲在辛末余月
location	E52 Time-Span	between 1905 and 1908
location	E53 Place	Batavia
material	E55 Material	wood
material	E61 Time Primitive	1905
community	E74 Group	Chinese Community of Lhokseumawe
person's name	E82 Actor Appellation	武安眞君傳香吧浪
inscriptions	E90 Symbolic Object	武安眞君傳香吧浪
identifiable inscriptions	E73 Information Object	武安眞君傳香吧浪
space-time	E92 Spacetime Volume	Located at Jalan Jen. Gatot Subroto，but no more extant in the 1980s.

Some entity types are left unexpressed in WFCEM, or are expressed only implicitely or vaguely. Yet, with the help of external knowledge resources, reasoning algorithms or new field data, these missing data can be recovered and represented as CIDOC-CRM Entities.

CIDOC-CRM Entity	Example
E54 Dimension	size, weight, diameter, density
E94 Space Object	6.1427,106.8119

Different sub-types of the WFCEM entity types, e.g. the sub-types of the type 'site' are distinguished by the CIDOC-CRM property `P101 has_as_general_use`. Likewise objects will be specified using the property `P101 has_as_general_use`. How these objects and sites are distinguished is not specified within CIDOC-CRM.

WFCEM entity type	CIDOC-CRM Entity	CIDOC-CRM Property
graveyard	E27	P101=community burial
tomb	E27	P101=personal burial
school	E27	P101=community teaching
monument	E27	P101=memorial
museum	E27	P101=exposition
temple	E27	P101=community worship
side-temple	E27	P101=community worship
tombstone	E19	P101=memorial of deceased
stone stele	E19	P101=memorial of temple renovation
wooden tablet	E19	P101=expression of blessing
incense burner	E19	P101=burning incense
altar	E19	P101=collecting offerings to venerate a deity

Many entities in CIDOC-CRM can be further specified by part-of relations, specifying. e.g. that the site tomb can be part of the site graveyard, or that the object tombstone is part of the tomb. Objects not included into a larger object are double-encoded as site and object, each with its specific properties. For example, an isolated removed tombstone is in the site of this isolated unused tombstone.